

# Hydrogeology and Water Supply Wells Catoctin Mountain Park

Natural Resource Report NPS/NRPC/WRD/NRTR—2007/374



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List of Acronyms

gpm gallons per minute
gpd gallons per day
cfs cubic feet per second

1 cfs = 450 gpm

## **Summary**

Groundwater pumped from wells in Catoctin Mountain Park is obtained from fractures in the underlying metamorphic rocks. There appears to be no consistent relationship between the hydrogeologic setting of well locations and well yield. Wells within close proximity and constructed in similar hydrogeologic settings may produce large volumes of water, or nearly nothing. Well yield is entirely dependent on the amount of fractured rock encountered at depth and the water-bearing characteristics of those fractures.

The potential for constructing wells with large yields can be increased by locating them on the east side of stream valleys. Infiltration of water in stream valleys will eventually reach the underlying southeasterly dipping bedrock and follow bedding planes and fractures downdip, toward the southeast. Thus, a well located downdip of a stream (recharge source) will have a better chance of producing water than wells in other locations.

There is sufficient pumping capacity from existing wells in the park to meet current demand. No additional facilities are planned. If additional supplies are needed in the future, some of the existing low-volume wells could be developed as supplemental water sources.

## Introduction

Catoctin Mountain Park covers nearly 6000 acres of mountainous terrain in the Blue Ridge Province of western Maryland. The park contains several camp/cabin areas dating back to the era of the Great Depression. Over the years, approximately 20 wells have been drilled in the park to provide water for NPS facilities. Only about half of those wells were deemed successful; producing enough water to be developed and equipped with pumps.

This report summarizes the hydrogeology and the history of well drilling in the park. Although there appears to be no definite pattern or geologic conditions that will insure successful well drilling, the chances for success can be improved by locating future wells on the east side of perennial streams to take advantage of the streams as a potential source of groundwater recharge.

## **Previous Investigations**

The geology of the park and surrounding area has been mapped by Whitaker (1955), Fauth (1977), and Southworth and Denenny (2006).

Nutter (1971) supervised construction and testing of a water supply well at the Camp Peniel environmental education center. The facility is now the headquarters and administrative offices for the park.

Huth Engineers (1981) evaluated wastewater disposal systems, water supply systems, and fire protection systems for the Camp Greentop and Camp Round Meadow areas.

Trombley and Zynjuk (1985) reported on the hydrogeology and water quality of the park. Their work included sampling and analyses of water quality for wells, springs, and streams throughout the park. They also supervised construction and testing of a new well at Quarters #5 and investigated the potential for infiltration from sewage treatment facilities at Camp Round Meadow to affect groundwater quality at nearby wells.

Dine, Tompkins, and Duigon (1985) compiled basic data for water wells in Frederick County. Duigon and Dine (1987) provided an assessment of water resources of Frederick County to provide the basic hydrologic background for planning, development, and other activities.

## **Geology and Hydrogeology**

Catoctin Mountain Park is situated on the east limb of the Blue Ridge-South Mountain anticlinorium, immediately west of the transition from the Piedmont to the Blue Ridge physiographic provinces (Figure 1). Geologic formations underlying the park dip toward the southeast (Southworth and Denenny, 2006).

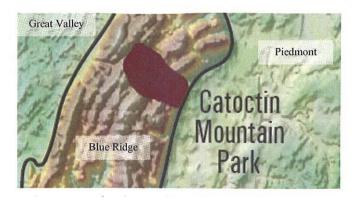


Figure 1. Physiographic setting of Catoctin Mountain Park.

The park is underlain by PreCambrian metamorphic rocks. The western part of the park is underlain by Catoctin Formation. The two main types of rocks comprising the Catoctin Formation are a greenish-gray metabasalt and a bluish-grayish metarhyolite. The eastern part of the park is underlain by the Loudoun Formation, which is comprised of phyllite and conglomerate units. Overlying the Loudoun, and outcropping in the very eastern part of the park, is the Weverton Formation. The Weverton is comprised of a sequence of interbedded quartzite, phyllite, and conglomerate. A geologic map of the park and a geological cross section are provided in Figure 2.

The metabasalt and metarhyolite rocks comprising the Catoctin Formation were originally deposited as molten rock from volcanic eruptions. The volcanic rocks were later covered by quartz sand deposited as river sediments. These geologic units were subsequently buried and

subjected to heat and pressure to metamorphose into their current state. The units were then uplifted by mountain-building processes and uncovered by erosion of the overlying rocks.

Landforms and topography in Catoctin Mountain Park are largely a function of the type of bedrock. The rock near the contacts between geologic units tends to be more fractured, and thus more easily eroded, than rock from the interior parts of the formations. Linear valleys that parallel the northeast-trending bedding and foliation planes of the bedrock have formed along the contacts between the Catoctin and Loudoun Formations and between the metabasalt and metarhyolite comprising the Catoctin Formation (Southworth and Denenny, 2006).

Rock units in the park are highly fractured and folded. The major axes of folding and cleavage planes strike northeast-southwest. Cleavage along bedding planes and fractures dip toward the southeast at approximately 45 degrees (Trombley and Zynjuk, 1985).

Groundwater in the park occurs in the regolith zone overlying unweathered bedrock and within fracture zones in the bedrock. The regolith is comprised of all of the soil and rock material overlying the unaltered bedrock and includes both material that has been transported and material that has weathered in place. The regolith is thinner at the top of Catoctin Mountain and along ridges and thicker in the valleys. The regolith has moderate porosity and permeability. It is the principal aquifer in the park. Groundwater also occurs in the openings along bedding planes, cleavage planes, joints, and faults within the bedrock. The number, size, and interconnectivity of these openings determine the water-producing potential of the bedrock. In general, bedrock openings decrease with depth as the weight of the overlying rock tends to squeeze the openings closed. Areas underlying valleys tend to be better locations for wells because there is a constant source of recharge from infiltration of water from streams.

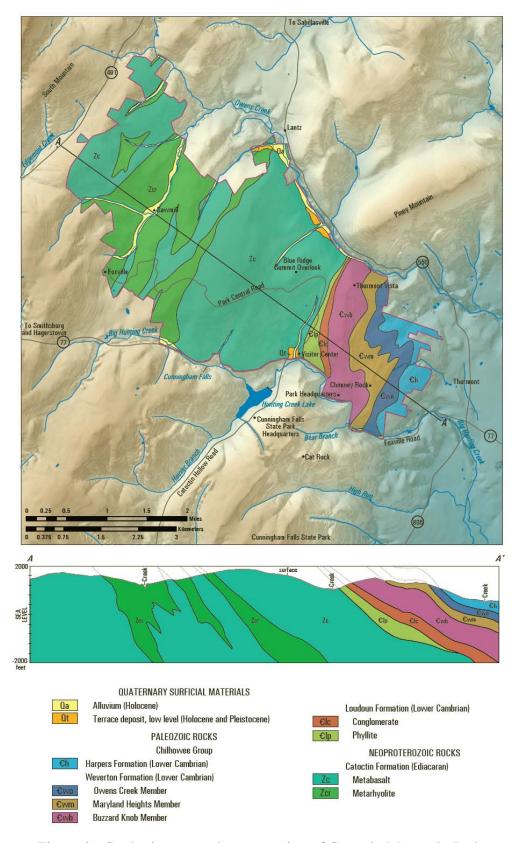


Figure 2. Geologic map and cross section of Catoctin Mountain Park (from Southworth and Denenny, 2006).

Trombley and Zynjuk (1985) estimate that the regolith extends to a depth of about 200 feet at Camp Round Meadow. The regolith is less thick beneath the ridges and mountains. The success of a well constructed at Catoction depends on the thickness of the regolith, the thickness and degree of fracturing in the bedrock, and the degree of interconnectivity with surrounding fractured rock. As a general guideline, test holes for water supply wells probably do not need to exceed 300 feet deep.

## **Well Inventory**

Table 1 is a listing of all wells in Catoctin Mountain Park. It does not include wells and test holes at The Presidential Retreat or the Naval Support Facility, Thurmont, at Round Meadow. Well completion reports (as available) are attached as an appendix to this report. Well completion reports could not be found for every well.

Table 1 shows that none of the water supply wells constructed in 1983 and earlier were more than 250 feet deep, and many of them were capable of producing more than 30 gpm; some had a capacity exceeding 50 gpm. Wells constructed in 2002 and 2006 ranged in depth from 400-800 feet, but did not have a better ratio of success than did shallower wells constructed in preceding years. Both of the 800-foot deep wells did not produce enough water to warrant development as water supply sources.

## Water Systems/Active Wells

There are currently four water systems at Catoctin Mountain Park: Headquarters, Blue Blazes, Round Meadow, and the Ike Smith water system. Quarters No. 5 and No. 6 are single family residences that are each supplied by a domestic well.

The Naval Support Facility, Thurmont, operates several wells in the Round Meadow area to supply water for The Presidential Retreat. Information for these wells is not readily available and they are not discussed in this report.

Table 1. Wells in Catoctin Mountain Park

Well Number (MGS)	State Permit Number (well tag no.)	Well Name	Year Const.	Depth feet	Yield, gpm	Use* (2007)
FR-BD-5		Jim Brown 0	1936	40	8.5	Abandoned
FR-BD-6	FR-01-8989	Greentop	1955	230	25	Inactive
FR-BD-7	FR-02-1967 FR-02-5349	Misty Mount 1 Deepen MM 1	1956 1956	76 180	3.6	Inactive
FR-BD-8	FR-02-5350	Misty Mount 2	1956	127	24	Inactive
FR-BD-34	FR-03-2795	Blue Blazes 1	1959	230	32	BB/MM
FR-BD-40	FR-66-0492	Poplar Grove 1	1966	180	40	IS
FR-BD-41	FR-66-0489	Poplar Grove 2	1966	160	33	IS
FR-BD-43	FR-66-0490	Jim Brown 1	1966	120	74	RM
FR-BD-44	FR-66-0491	Jim Brown 2	1966	247	8.5	Inactive
FR-BD-49	FR-71-0428	Headquarters	1971	202	19	HQ
FR-BD-114	FR-81-1284	Quarters 5	1983	145	60	SFD
		Quarters 6		120		SFD
	FR-94-3010	Jim Brown 3	2002	800	6	Inactive
	FR-94-3011	Jim Brown 4	2002	500	140	RM
	FR-95-0125	Ike Smith Test Hole	2006	800	10	Inactive
	FR-95-0126	Test Hole at Blue Blazes	2006	600	10	Inactive
	FR-95-0303	Blue Blazes 2	2006	660	23	BB/MM
	FR-95-0304	Test Hole at Bldg 167	2006	500	15	Inactive
	FR-95-0305	Ike Smith Well	2006	420	100	IS

MGS (column 1) is Maryland Geological Survey

BB/MM – Blue Blazes, Misty Mount, Visitor Center

IS – Ike Smith water system supplies Owens Creek, Poplar Grove, Chestnut, Greentop

RM – Round Meadow water system

HQ – Park Headquarters

SFD – Single Family Dwelling

<sup>\*</sup> Active water wells in the park supply water to the following water systems:

#### **Headquarters**

Park Headquarters is at the former site of Camp Peniel, an environmental education camp. A well (FR-71-0428) was constructed there in 1971 (Figure 3). It is 202 feet deep. The well has 6-inch steel casing to 30 feet. The annular space outside the casing was sealed with grout to prevent surface water flow flowing into the well and contaminating the well. The well was completed with a 6-inch open borehole from 30-202 feet. Pumping tests determined that the well has a specific capacity of 1½ gpm/foot of drawdown. The well was test pumped for only 3¼ hours at rates less than 20 gpm. It was conservatively estimated that the well could reliably produce 20 gpm for several hours. Additional testing would be needed to determine the maximum sustained yield of the well if additional water is needed at the headquarters area (Nutter, 1971).

The well was constructed into the Weverton Formation which is a greenish-gray quartzite and quartz conglomerate that has been compacted and metamorphosed to any of the original granular porosity of the quartz sand. Phyllite (metamorphosed shale) is interbedded with the quartzite. Groundwater occurs in joints, faults, and other fractures in the rock.

#### **Blue Blazes**

The Blue Blazes Well No. 1 supplies water to all NPS facilities from the Visitor Center to the Misty Mount Cabins, including the roads and trails maintenance building and two houses (HS-128 and PG-167). A second well was constructed near the maintenance building in August 2006 to supplement the supply from the Blue Blazes Well No. 1. Estimated peak demand for this water system is 9,000 gpd in winter and 12,000 gpd in summer. Well locations are shown in Figure 3. The water system has one 33,000 gallon storage tank at Misty Mount.

The Blue Blazes Well No. 1 (FR-03-2795) was constructed in February 1959 and is 230 feet deep. The well obtains water from fractures in the Catoctin Formation. The well produces 20 gpm with the pump that is currently installed. Trombley and Zynjuk (1985) stated that the well could produce 32 gpm. The well was hydrofracked in the early 1990s, resulting in increasing the yield to about 50 gpm.

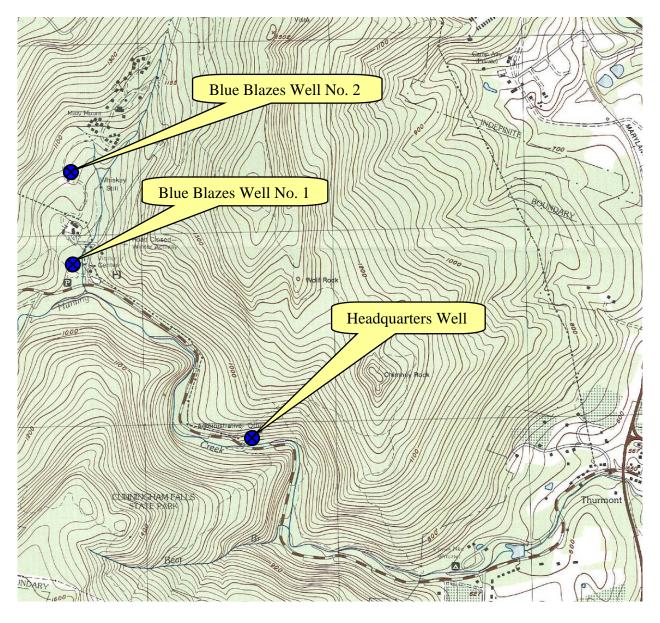


Figure 3. Location of the Headquarters and Blue Blazes Wells.

Blue Blazes Well No. 2 (FR-95-0303) was constructed about 750 feet north of the maintenance shop in August 2006. The well is located at the east edge of a clearing, east of an old barn. Water is obtained from fractures in the Catoctin Formation. The well is 660 feet deep and has 8-inch steel casing with a cement grout seal from 0-58 feet. The well is an open borehole from 58-660 feet. The well was test pumped for 25 hours at 23 gpm, causing the water table to draw down from the static water level of 42 feet below ground surface to 155 feet below ground surface. Figure 4 shows the water level response in the well during test pumping and recovery.

#### Blue Blazes Well No. 2 (FR-95-0303) 24 Hour Pumping Test, October 11-13, 2006

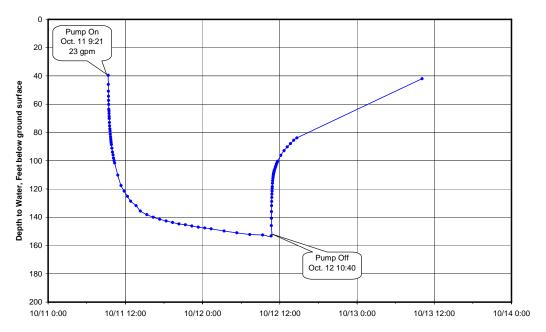


Figure 4. Water level drawdown and recovery during testing of Blue Blazes Well No. 2.

#### **Round Meadow**

The Round Meadow water system is supplied by the Jim Brown Wells. There are three inactive wells in the area, which are discussed in a later section of this report. There are two active wells which pump water to two, 33,000-gallon underground tanks. Water is used to supply park service facilities at Round Meadow and the Round Meadow group camp. Well locations are shown on Figure 5.

#### Jim Brown Well No. 2

Well FR-66-0490 was constructed in March 1966 and is 120 feet deep. The well obtains water from fractures in the Catoctin Formation. The well has 6-inch casing with a grout seal to a depth of 26 feet. The well is a 6-inch open borehole from 26-120 feet. The well was test pumped for 24 hours at 74 gpm, causing the water level to draw down from the static water level of 29 feet to 70 feet below ground surface.

#### Jim Brown Well No. 4

Well FR-94-3011 was constructed in April 2002 and is 500 feet deep. The well obtains water from fractures in the Catoctin Formation. The well has 8-inch casing with a grout seal to a depth of 55 feet. The well is an 8-inch open borehole from 55-500 feet. The well was test pumped by airlifting for 3 hours at 100 gpm, causing the water level to draw down from the static water level of 50 feet to 500 feet below ground surface.

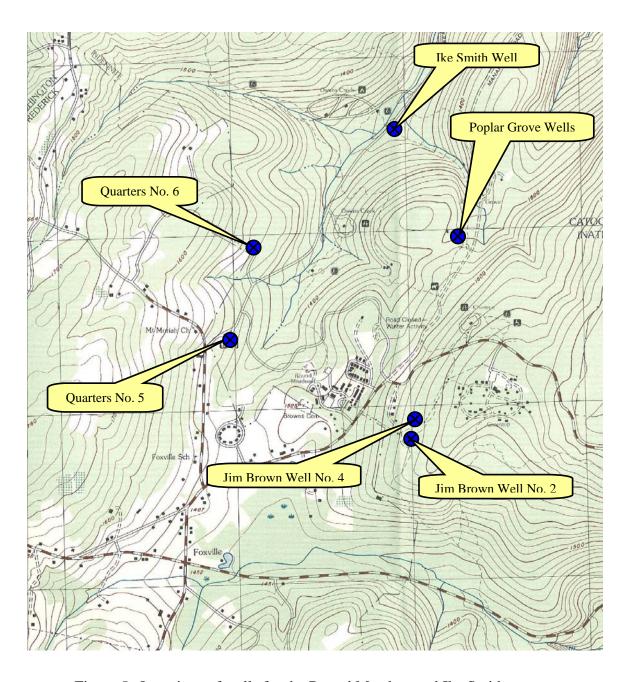


Figure 5. Locations of wells for the Round Meadow and Ike Smith water systems.

#### **Ike Smith Water System**

The Ike Smith water system is supplied from two wells at the Poplar Grove II group campsite and the new (2006) Ike Smith Well in the Owens Creek Valley (Figure 5). Water from the wells is pumped to the underground storage tank at the Ike Smith pump house and then pumped to two 33,000 gallon storage tanks north of Camp Greentop. Chlorination for water in this system occurs at each well house as water is pumped from the well. Water from this system supplies Camp Greentop, Poplar Grove group camps, Chestnut Picnic area, and Owens Creek campground and picnic area. Peak demand for this water system is less than 15,000 gpd.

#### Poplar Grove Wells

There are two water supply wells at the Poplar Grove II group campsite (Figure 5). These wells were constructed in 1966 to replace a surface water source from the Ike Smith Springs.

Well FR-66-0489 was completed in March 1966. It is 160 feet deep and is cased and grouted to a depth of 45 feet. The well is a 6-inch open borehole from 45-160 feet. The well was test pumped for 24 hours at 35 gpm, causing the water level to draw down from the static water level of 55 feet to 86 feet below ground surface.

Well FR-66-0492 was completed in March 1966. It is 180 feet deep and is cased and grouted to a depth of 75 feet. The well is a 6-inch open borehole from 75-160 feet. The well was test pumped for 24 hours at 40 gpm, causing the water level to draw down from the static water level of 60 feet to 85 feet below ground surface.

#### Ike Smith Well

Two wells were constructed in the vicinity of Ike Smith Springs in the summer of 2006. The first well (FR-95-0125), which was constructed near the springs and pump house, did not produce much water and was capped. Additional information regarding this well is presented in the "Inactive Wells" section of this report. The second well was located in the Owens Creek valley and produces about 100 gpm. This well (FR-95-0305) will be connected to the Camp Greentop, Poplar Grove, Owens Creek water system.

Well FR-95-0305 was constructed in September 2006. It is located on the east side of the Owens Creek valley, at the intersection of the trail from Ike Smith Springs and the Foxville-Deerfield Road (Figure 5). The well is 420 feet deep and is cased and grouted to a depth of 56 feet. The well is an 8-inch open borehole from 56-420 feet. The well was test pumped for 25 hours at 100 gpm, causing the water level to draw down from the static water level of 17 feet to 75 feet below ground surface. Figure 6 shows the water level response in the well during test pumping and recovery.

#### Ike Smith Well (FR-95-0305) 24 Hour Pumping Test, October 4-5, 2006

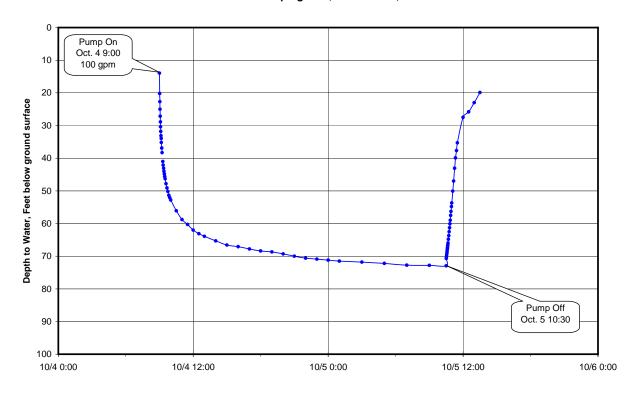


Figure 6. Water level drawdown and recovery during testing of the Ike Smith Well.

#### Quarters No. 5

The well at Quarters No. 5 (Figure 5) was constructed in 1983 to replace a contaminated spring source. The well is 138 feet deep and 6 inches in diameter. The well was test pumped at 60 gpm for 5 hours, but that pumping rate could not be sustained as the water level in the well was continuing to decline, showing no evidence that the rate of decline was decreasing.

#### Quarters No. 6

Quarters No. 6 is a single-family home (Figure 5). The well is 120 feet deep and 6 inches in diameter.

### **Inactive Wells**

Several wells in Catoctin Mountain Park are no longer used for one reason or another. Basic data for these wells are included in Table 1. Well completion reports (as available) are included in the appendix of this report. Available information for these wells is summarized in the following sections.

#### Misty Mount/Blue Blazes Area

There are two inactive wells in the Misty Mount Cabins area (Figure 7). Both wells were located in the north-south trending valley east of the Misty Mount Cabins. The wells were constructed in 1956. Two test wells were drilled in the Blue Blazes area in August and September 2006.

Well FR-02-5349 was constructed in the Winter and Spring of 1956. It was drilled to a depth of 180 feet and produced less than 5 gpm. Water is obtained from fractures in the Catoctin Formation. The well is located east of the creek and about 50 feet north of the entrance road to the Misty Mount Cabins (Figure 7). The well did not produce enough water to warrant installation of a pump. There is no record of it ever being used as a water supply source. Some of the documents in the park files refer to this as Well No. 1 or Well A, as it was the first well drilled in the area.

Well FR-02-5350 was constructed in June 1956. It is located on the east side of the creek and about 300 feet north of Well FR-02-5349 (Figure 7). The well is 127 feet deep and will produce about 25 gpm if its use is limited to about 8 hours per day. Water is obtained from fractures in the Catoctin Formation. The well is on the east side of the creek, and the cabins are on the west side of the creek. Well FR-02-5350 has not been utilized for several years because maintenance of a water line across the creek has always been problematic. However, the well was the sole source of water for the Misty Mount Cabins for many years following its construction until a

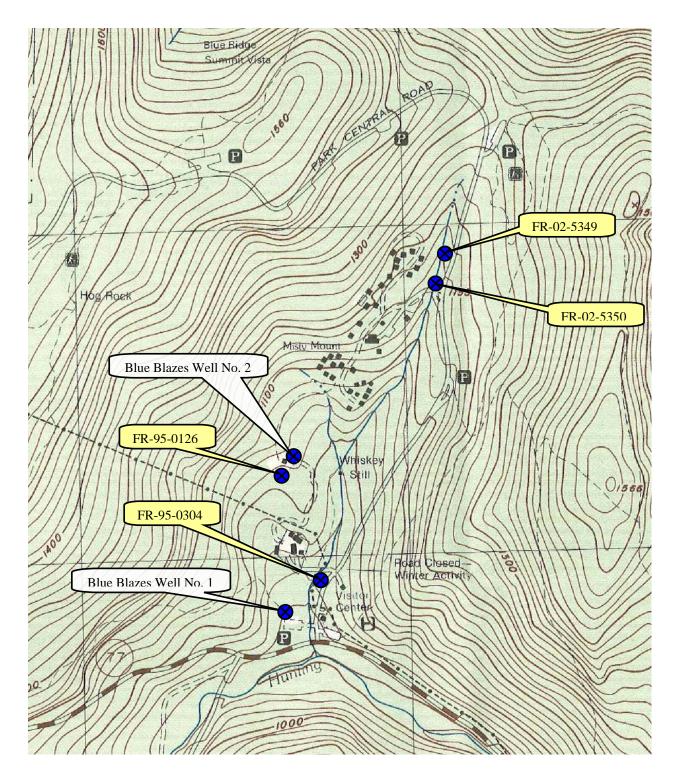


Figure 7. Inactive wells in the Misty Mount/Blue Blazes area.

Location of the active Blue Blazes Wells No. 1 & 2 are shown for reference.

new water system was constructed in 1960(?) and water from the Blue Blazes Well was piped into the area. Some of the documents in the park files refer to this as Well No. 2 or Well B, as it was the second well drilled in the area.

Well FR-95-0126 was constructed in August 2006. It is located north of the maintenance shop, about 300 feet south of the communications tower (Figure 7). The well was drilled to a depth of 600 feet in the Catoctin Formation and was pumped dry in 3 hours when pumped at 10 gpm. The well has been capped, and there are no plans to use it.

Well FR-95-0304 was constructed in September 2006. It is located at the end of the driveway, approximately 60 feet southwest of Building 167 (Figure 7). The well was drilled to a depth of 500 feet deep in the Catoctin Formation and was pumped dry in 3 hours when pumped at 15 gpm. The well has been capped, and there are no plans to use it.

#### **Ike Smith Springs Area**

Well FR-95-0125 was constructed at Ike Smith Springs in August 2006 (Figure 8). The well is on the north side of the access road to the pump house and east of the creek. The well was drilled to 800 feet and has 8-inch steel casing grouted in place to a depth of 78 feet. The well is an 8-inch open borehole from 78-800 feet. Production was tested by the air-lifting method for 3 hours. The well was estimated to yield 10 gpm. The well was capped and placed in inactive status due to the low estimated yield.

#### Greentop

A test hole was drilled north of the Central Park Road near the Greentop entrance in 1955 (Figure 8). The well (FR-01-8989) was drilled to 230 feet deep and was test pumped for 24 hours at 25 gpm, resulting in drawdown of about 10 feet below the static water level of 27 feet below ground surface. These data would seem to indicate the well would be a reliable source of water, but there was concern that the well might be constructed in a "pocket" of fractured rock that might be dewatered during long periods of continuous use or during droughts (Otton, 1955). There is no record that the well was ever equipped with a pump or used as for water supply.

#### Jim Brown

The original well in the Jim Brown area was 40 feet deep and was constructed in 1936. The well was backfilled with concrete and the casing was cut off below ground surface around 1978. The associated concrete storage tank (approximately 15,000 gallons) was removed about 1980. The original Jim Brown Well was no longer needed after construction of the Jim Brown Well No. 2 provided an alternative source of water for facilities at Round Meaadow.

There are two inactive wells in the Jim Brown area (Figure 8).

The Jim Brown Well No.1 (FR-66-0491) was constructed in April 1966. The well was drilled to 250 feet and has 6-inch steel casing grouted in place to a depth of 46 feet. The well is a 6-inch open borehole from 46-250 feet. The well was test pumped at 10 gpm for 9 hours, causing the water level to draw down from the static level of 21 feet to 53 feet below ground level. The well was capped and placed in inactive status due to the low estimated yield. The well is in the middle of the hiking trail (Catoctin Trail) about 350 feet south of the pump house at Jim Brown Well No.2.

The Jim Brown Well No. 3 (FR-94-3010) was constructed in April 2002. The well was drilled to 800 feet and has 8-inch steel casing grouted in place to a depth of 60 feet. The well is an 8-inch open borehole from 60-800 feet. The well was test pumped by airlifting from 800 feet and produced an average of 6 gpm for 3 hours. The static water level was 50 feet below ground surface. The well was capped and placed in inactive status due to the low estimated yield.

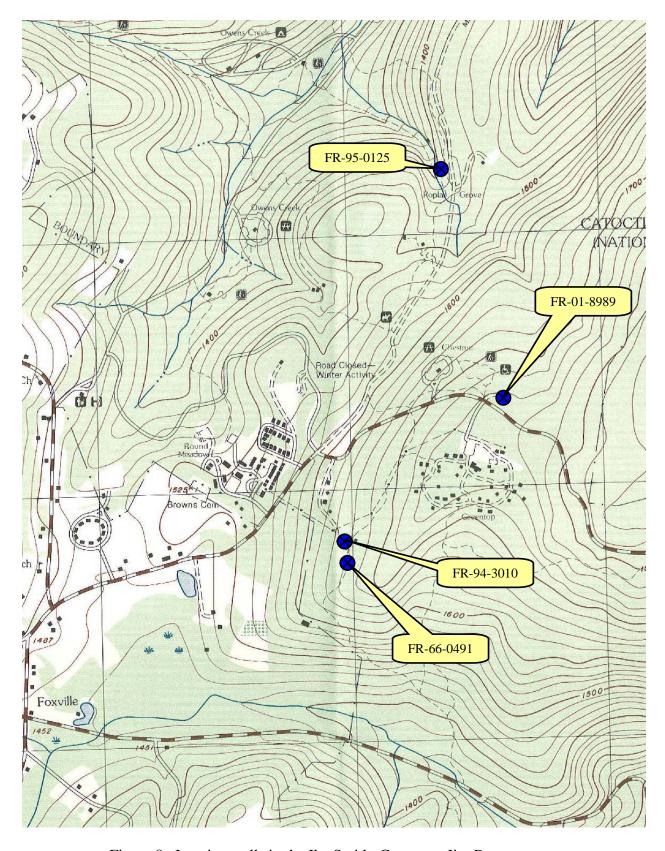


Figure 8. Inactive wells in the Ike Smith, Greentop, Jim Brown areas.

## Water Use and Potential for Streamflow Depletion

Firm figures for water use at the park were not available. The estimated peak use (per John Hart, Facility Manager) for the various systems is:

Round Meadow 11,000 gpd Ike Smith 15,000 gpd

Blue Blazes 12,000 gpd summer

9,000 gpd winter

There are no plans to develop additional facilities at the park, and thus, it's not likely that water use will increase in the future. Usage might decrease as older toilets and showerheads are replaced with low-flow fixtures.

All groundwater has the potential to flow toward, and discharge to, adjacent streams. Pumping groundwater from a well near a stream intercepts some of the groundwater flowing toward the stream, resulting in streamflow depletion. The amount of streamflow depletion is a function of the depth of the well, the distance from the stream, and the degree of interconnection between the stream and groundwater at that particular site. As a worst-case analysis, we can assume a perfect connection between groundwater pumping and streamflow reduction. That is, streamflow is reduced by an amount equal to the rate of groundwater pumping. As an example, we could assume that all of the water demand for the Ike Smith water system is pumped from the new Ike Smith Well adjacent to Owens Creek. Pumping the well continuously at 15,000 gpd is the equivalent of 0.02 cfs. The maximum amount of streamflow depletion from pumping the well is 0.02 cfs.

In reality the impact of groundwater pumping on streamflow is reduced by the return of most of the water to the groundwater system by infiltration through septic leachfields. The numbers given for peak demand represent the maximum pumping from the various wells; demand is much lower on many days. Also, most of the water systems obtain water from a number of wells at various distances from streams. As the volume of water pumped in any given day decreases and the distance from the stream increases, the amount of streamflow depletion decreases.

## **Recommended Locations for Well Construction**

The strike of geologic formations underlying the park generally follows a NE-SW trend. Many of the stream valleys are oriented along this same trend because it is easier for natural erosion processes to follow the natural fracture patterns in the bedrock than perpendicular to the natural fracture pattern.

The dip of the formations is southeasterly at about 40-50°. A dip of 45° would have a slope of 1:1. If we have a situation where a stream valley has formed over a fractured section of the rock units (the fractured rock being more easily erodible), we may have groundwater recharge occurring as infiltration from the stream into the outcrop of the rock. The groundwater could then flow down the dipping slope of the fractured rock and could be intercepted by a well drilled a short distance downgradient (southeast) from the stream. This scenario is shown in the following sketch (Figure 9). Because the dip of the geologic formations is approximately 45°, the rock units underlying the stream will be 100 feet deeper for every 100 feet that the well is located southeast from the stream.

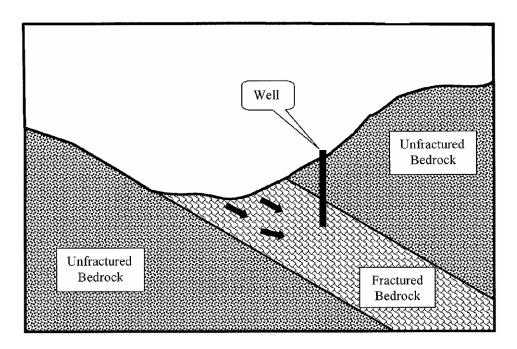


Figure 9. Hydrogeologic model for siting well locations.

It appears that two of the most productive wells, Blue Blazes No. 1 and the new Ike Smith well, fit this hydrogeologic model. However, the Jim Brown No. 4 well does not fit this model and yet produces 100 gpm.

Successful development of water-supply wells at Catoctin is mostly dependent on encountering fracture zones below the water table and the degree to which those fracture zones are interconnected with other water-bearing fractures. It is nearly impossible to conduct surface analyses to determine whether there will be fractures at some depth and even more problematic determining whether those fractures will yield significant amounts of water to a well. The odds of obtaining water from a well can be increased by locating new wells geologically "downgradient" from streams, but it doesn't guarantee success.

The seemingly random pattern of fracturing in the bedrock at Catoctin can readily be illustrated by looking at past well drilling. Four deep (400-800 feet) wells have been drilled in the vicinity of the Jim Brown Wells (Figures 5 & 8). Two of these wells produce large amounts of water (75-100 gpm), and two of the wells produce less than 10 gpm. At Misty Mount, two wells were drilled in the same geologic setting, the bottom of the valley east of the creek (Figure 7). One of the wells produced 25 gpm, and the other produced 3 gpm.

## **Typical Well Construction**

Typical construction for wells at Catoctin Mountain Park is shown in Figure 10. An oversize borehole (usually 12-14 inches diameter) is drilled through the soil and weathered bedrock comprising the regolith, penetrating several feet into bedrock. Well casing (6-8 inch inside diameter) is placed in the hole, and the annular space is filled with cement grout to form a surface seal to prevent downward flow of surface water into the borehole. The well is completed by drilling an uncased, open borehole into the fractured bedrock. Generally, the well casing and cement grout seal extends to about 40-60 feet below ground surface. Wells drilled prior to 2002 were generally no more than 200-250 feet total depth. Wells drilled in 2002 and later range from 400-800 feet deep.

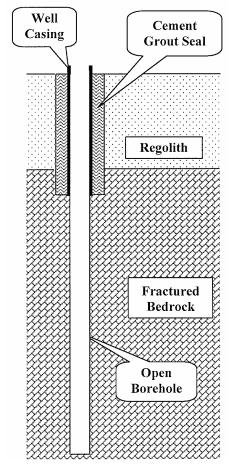


Figure 10. Typical well construction at Catoctin Mountain Park.

### Recommendations

Some of the inactive wells in the park could function as low-yield, supplemental supply wells. Constructing a well in this type of geologic environment that will yield more than 20 gpm should be considered unusual. It's much more likely that a well drilled in fractured metamorphic rock would yield less than 10 gpm. A 10 gpm well operated on a schedule of 8 hours on and 16 hours off will produce nearly 5,000 gpd. A couple of low-yield wells and adequate storage tanks can result in a viable water system.

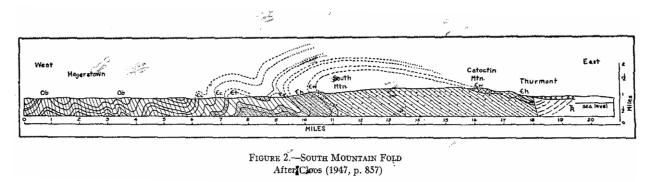
Some of the previously constructed, and currently inactive, wells might be very good supply wells. For example, the well at Greentop was reportedly test pumped at 25 gpm for 24 hours

with only 10 feet of drawdown. This would seem to indicate that it would be a very good well, but it has never been utilized. Before more wells are drilled at the park, records should be reviewed and existing inactive wells should be tested to determine whether they might meet the need.

Water levels in the existing wells should be measured on a regular basis to monitor water table changes in response to groundwater pumping, natural seasonal cycles, and drought effects. These data can also be used to identify problems with the pump or piping in a well. Often when a well stops pumping water or the pumping rate decreases, the first reaction is that the well must have gone dry, or is going dry. It's more likely that the pump is wearing out and pumps less efficiently, or there is a leak somewhere in the piping. Regular water-level monitoring will help diagnose production problems by identifying whether the problem lies with the pumping equipment or with the aquifer. Quarterly water level monitoring would be optimal; semiannual monitoring should be considered the minimum amount of data needed.

## **Glossary**

Anticlinorium – A regional anticlinal structure that may include smaller anticlines and synclines. A sketch of the Catoctin Mountain anticlinorium from Whitaker (1955) is shown below.



Metabasalt – A basalt that has undergone metamorphism. Often called greenstone.

Metarhyolite – Rhyolitic rock that has undergone metamorphism. The metarhyolite at Catoctin has a bluish or bluish-gray hue.

Phyllite – A metamorphic rock similar to schist but finer grained, so that the constituent grains cannot be seen with the unaided eye. Phyllite is considered to be a product of low-grade metamorphism. It is transitional between slate and schist.

Regolith – The regolith is everything from land surface down to solid bedrock. It includes soil and partially weathered rock overlying bedrock.

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## **Appendix**

## **Well Completion Reports**

Wells are listed in order of construction, oldest well first.

Greentop Well	1955
Misty Mount No. 1	1955
Deepen Misty Mount No. 1	1956
Misty Mount No. 2	1956
Blue Blazes No. 1	1958
Poplar Grove No. 1	1966
Poplar Grove No. 2	1966
Jim Brown No. 1	1966
Jim Brown No. 2	1966
Headquarters Well	1971
Quarters No. 5	1983
Jim Brown No. 3	2002
Jim Brown No. 4	2002
Ike Smith Test Hole	2006
Test Hole at Blue Blazes	2006
Blue Blazes No. 2	2006
Test Hole at Bldg. 167	2006
Ike Smith Well	2006

#### STATE OF MARYLAND

18751

## DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

An application must be submitted and	RMIT TO DRILL WELL I permit received before drilling a well
Owner Latomac River Lovel Common Miner Street or R. F. Diese Mashington 25. 444-	Driller Calumbia Pump & Sell Co. Street or R. F. D. 232 Gallatin St, A Post Office asshington 11, D Date april 29,1955
Quantity of Water Needed (G. P. M.) 20 Use for Water General Lisa Approximate Depth of Well (feet) 250 Method of Drilling to be used Gable-Tagl	Location of Well  County Frederick  Nearest Town Phulmont, Laryland  Distance from Town APPROX 6 mile  Direction from Town ABSt
PERMIT TO DRILL WELL  (Permit to be returned to Driller)  NOT TO SE FILLED IN BY DRILLER  Permit No	Description of Location of Well  (This information should be definite enough to perm locating well on a county map)  Near what road Catoctin National Park  On which side of road Morth (North East, South, West)  Distance from road 3/4 mile  Draw a sketch below showing location of well relation to nearby towns, roads and streams with north in the direction of the arrow.  Catoctic National North  Carop Ma. 3  Oners
Sample sacks furnished by U.S.G.S.	Thursday of the state of the st

STATE OF MARYLAND
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University BALTIMORE 18, MARYLAND

## WELL COMPLETION REPORT

must be submitted within 30 days after completion of the well

					Permit Number 18989	
WELL LOG State the kind of formations penet lepth, their thickness, and if wa	CASING AND scattering liner, shoe, state the kind and size of casing, liner, shoe, screen, and other accessories (if no casing used, give diameter of well)			Name of Owner Potomac River Nava. Command PUMPING TEST		
	FEET		DIAM. (inches)	from 0 to 2.3	Hours Pumped 24 Type of Pump Used Turbin	
Clay Boulders Lime Stone Lime Stone-openin	0-30 30-35 35-65 365-70 70-230	57ft8" pipe in place. 1 - 8" shoe	811		Pumping Rate Gallons per Minute25  WATER LEVEL Distance from land surface water:	
Lime Stone					Before Pumping 12 Before Pumping 36 to 12  When Pumping 36 to 12  APPEARANCE OF WATER Clear Clear	
		Length of air	Lincon'	195	Cloudy	
					Height of Casing Above La Surface L	
			*,1	Comment	Type.Turbine	
				750 R.FT	Gallons per Minute.20	
			Same 6-	1.65 or	Pump Column Length 200	
	and the state of t	Chia	(# r a	67714 )	25 - 62	
		livell	hod c	at oth		
			CC	Jumbia F	Well Was Completed Date June 7,1955 Well Driller ump & Well CO Signate	
					Signate	

### STATE OF MARYLAND

### DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University

BALTIMORE 18, MARYLAND

Misty Mount No. 1

1021961

APPLICATION FOR PERMIT TO DRILL WELL

An application must be submitted and permit received before drilling a well

Owner SATLENAL CARKSERVICE THURMANT	Min Chin R. Smith
Owner Add ICNAL CARITAERKICS TRUTAMON .	Strong on R. F. D. /
Street or R.F.D.	Street or R. F. D. Smithsbug midi
Street of A.F. D.	9,16 55
Post Office Thu RMONT OF DER NO 18-952	Date La Company

Quantity of Water Needed (G.P.M.) Use for Water Litras Approximate Depth of Well (feet) 150 Method of Drilling to be used...A

> PERMIT TO DRILL WELL (Permit to be returned to Driller)

NOT TO BE FILLED IN BY DRILLED

Permit No. 2196 Samples of Cuttings Required by Department No

Owner Requires Permit (Yes to Appropriate Water No.

Owner Has Permit Yes to Appropriate Water No.

The applicant is herewith granted a permit to drill this well subject to the conditions stipulated.

Owner's fermit issued 1/19/56

Location of Well

County Freds

Nearest Town Thur MONT

Distance from Town. Direction from Town 14/2

Description of Location of Well

(This information should be definite enough to permit locating well on a county map)

Near what road TO XSV !! E TO THE WITHOUT

Distance from road 1/ Mill Lamp May

Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow.

NORTH

(DUPLICATE)

### STATE OF MARYLAND

## DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University BALTIMORE 18, MARYLAND

This report must be s				Permit Number 2/967
WELL LOG State the kind of formations penetrated, their depth, their thickness, and if water-bearing	CASING AND State the kind and si screen, and other acces give diameter of well)			Name of Owner  WATIONAL PARK SERVE  PUMPING TEST
Earth 15-30 Rock 30-42 Rock 12-51 Water leaving at 51 Rock not selected from 12-51 Rock not selected from 51-76	galania de la	DIAM. (inches)	FRET  from	Hours Pumped Type of Pump Used Type of Pump Used Pumping Rate Gallons per Minute  WATER LEVEL  Distance from land surfaces water:  Before Pumping When Pumping  APPEARANCE OF WATER Clear Cloudy Taste Odor  Height of Casing Above La Surface  PUMP INSTALLED  Type Capacity Gallons per Minute Gallons per Hour Pump Column Length  REMARKS  MACLE Well Was Completed Date Well Was Completed Date Well Driller  Signature

FACTO FILING 25347 Post EX STATE OF MARYLAND Form 4 DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES The Johns Hopkins University Deepen BALTIMORE 18, MARYLAND FR\$25349 Misty Mount No. 1 APPLICATION FOR PERMIT TO DRILL WELL An application must be submitted and permit received before drilling a well Katt BROW Driller William MilleR OWNER CATOCTIN NATIFARK SERVICE Street or R. F. D. Post Office THURMONT, Md Quantity of Water Needed (G. P. M.) Location of Well Use for Water PARK Public SERVICE T County FREDERICK Nearest Town thuR MONT Approximate Depth of Well (feet) 180 Distance from Town 3,5 Method of Drilling to be used CASLE fooLS CHURN DRITI Direction from Town West Description of Location of Well PERMIT TO DRILL WELL (This information should be definite enough to permit locating well on a county map).

Near what road N. & FARK OFFICE (Permit to be returned to Driller) NOT TO BE FILLED IN BY DRILLER On which side of road ON LEFT OR West Side Distance from road 40' FRem PARIX DRIVE Samples of Cuttings (Yes Required by Department No Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow. Owner Requires Permit {Yes to Appropriate Water \ No Owner Has Permit (Yes to Appropriate Water (No The applicant is herewith granted a permit to drill this well subject to the conditions stipulated. NORTH Jans Carryon Co Date 12635234 6-136556 to PARK Special conditions that may apply: See P21,967 for part of hole drilled by Elvin R. Smith. this is Not to SCALE

(ORIGINAL)

ROADS ARE ONLY GENERAL DIRECTIONS

# EX POST FACTO FILING WEIL #1 STATE OF MARYLAND DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES OF MARYLAND WATER RESOURCES

WELL LOG  WELL DESCRIPTION  WELL LOG  WELL DESCRIPTION  WELL DESCRIPTION  WELL LOG  WELL DESCRIPTION  CASING AND SCREEN RECORD State the kind and size of casing, liner, shoe, green, and other accessories (if no casing used, give diameter of well)  PET  ##ARD CONGIOMERATE  ##ARD CONGIOM	FI	PA2534	AW/TOT	BALTIMORE 18, MARYI	REPORT		ا شهر د
WELL DESCRIPTION  WELL LOG State the kind of formations pretrated, their depth, their thickness, and if water-bearing depth		This repo	rt must be sul	bmitted within 30 days	after comple	tion of the	well /80
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State the kind of formations penetrated, their depth, their thickness, and if water-bearing served and other accessories (if no casing used, give diameter of well)  HARD CONCLOMERATE  HARD CONCLOMERATE  Town 18. 180  Length of CASING MAY have been fired by ELVIN R. SMITH Hours Pumped 2.4. Type of Fump Used Plenk Water Level By ELVIN R. SMITH Permits Rate Gallons per Minute 3.6 May have been fired by ELVIN R. SMITH Permits Rate Gallons per Minute 3.6 May have been fired by EVIN R. SMITH Permits Rate Gallons per Minute 3.6 May have been fired by EVIN R. SMITH Permits Rate Gallons Permits Rate	2		WEDD DEC		REEN RECOR	D	Name of Owner
HARD CONGIONERATE  TOTAL TO THE TOTAL TO THE TOTAL TOT	State the		rated, their ter-bearing	State the kind and size	of casing, line	ng used,	SERVICE
MAY HAVE GOEN EVEL  by ELVIN R. SM1+h  PERMIT # 21967, Not com Pleted, Bot DRIVED Deeper by Kohl Bros.  When Pumping 168.  APPEARANCE OF WATI Clear Clear Cloudy Taste Odor  Height of Casing Above I  Surface  PUMP INSTALLED  Type Mey Capacity Gallons per Minute of Gallons per Hour CAR  Pump Column Length  REMARKS			PEET	- 1	(inches) fro	to	Hours Pumped 24 Type of Pump Used Plume
PERMITH 21967, NET COMPLETED BOT DRIVED DEEPER BY KOHL BROS,  Distance from land surface water:  Before Pumping C. When Pumping 168. APPEARANCE OF WATT Clear C.L.EAR. Cloudy Taste Odor  Height of Casing Above I Surface  PUMP INSTALLED Type Gallons per Minute Gallons per Hour CAR Pump Column Length  REMARKS	· · · · · · · · · · · · · · · · · · ·			MAY HAVE	been FVI	led.	Gallons per Minute
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Taste Odor  Height of Casing Above I Surface  PUMP INSTALLED  Type Capacity Gallons per Minute Gallons per Hour CAR  Pump Column Length  REMARKS				KOHL BROS.			Clear CLEAR
Height of Casing Above I Surface  PUMP INSTALLED  Type  Capacity  Gallons per Minute  Gallons per Hour  Pump Column Length  REMARKS		·					Taste
PUMP INSTALLED  Type							Height of Casing Above
Capacity  Gallons per Minute  Gallons per Hour  Pump Column Length  REMARKS							
Gallons per Hour Pump Column Length REMARKS							Type
REMARKS							Gallons per Hour
Well Was Completed Date APR. 19, 1956. Well Driller WM. Miller Ren Kohl B Ros., Richard St. With							
Well Was Completed Date APR. 19, 1956 Well Driller WM. Miller Well Driller WM. Miller Ren Kohl B Ros., Richard J. With							
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Well Was Completed Date APR. 19, 1956 Well Desilier WM. Miller PER KOLL BROS., Richard St. With							
PER KOLL BROS, Richard St. Will							Well Was Completed Date APR. 19, 1956
					Per	KO4LB	Res Richard With

### EX Post FACTO FILING

· Form 4

STATE OF MARYLAND

DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University BALTIMORE 18, MARYLAND Misty Mount No. 2

ROR5350

APPLICATION FOR PERMIT TO DRILL WELL

	l permit received before drilling a well KOHL 景RoS
 Atoctin NATL PARK SERW	cedriller William MilleR
ı F. D.	Post Office EMMITISBURG MID
THUR MONT, MO	Date ///8/55
 Wester Needed (G. P. M.)	Location of Well

Quantity of Water Needed ( Use for Water PARK PUBLIC SERVICE I County FREDERICK Method of Drilling to be used CABLE tooLS CHURN DRILL

> PERMIT TO DRILL WELL (Permit to be returned to Driller)

NOT TO BE FILLED IN BY DRILLER

Permit No.

Samples of Cuttings Yes Required by Department \No Owner Requires Permit {Yes to Appropriate Water | No

Owner Has Permit Yes to Appropriate Water No

The applicant is herewith granted a permit to drill this well subject to the conditions stipulated.

Jan Jane grant Director Date 120 2006 13,1986

Special conditions that may apply:

11/356

Nearest Town + HURMONT

Distance from Town 3.6

Direction from Town West

Description of Location of Well

(This information should be definite enough to permit locating well on a county map) (MA + EIV 3000')

Near what road ALLOF PARK OFFICE

On which side of road LEFT OR WEST Side (North, East South, West)

Distance from road 100 FROM PARK DRIVE

Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow.

NORTH FROM CENT OF TOWN TO PARK OFFice

THIS IS NOT to SCALE ROADS ARE ONLY GENERAL DIREctions

(ORIGINAL)

### STATE OF MARYLAND EX

STATE OF MARYLAND

DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University BALTIMORE 18, MARYLAND

WELL COMPLETION REPORT

7. 28	WELL DE	SCRIPTION			Permit Number 2-5 3 4 Z
WELL LOG  State the kind of formations penetrated, their depth, their thickness, and if water-bearing		CASING AND SCREEN RECORD State the kind and size of casing, liner, shoe, screen, and other accessories (if no casing used, give diameter of well)			CAtoctin NAT. PARK
DVERBURDENO'- 15" HARD CONGLOMERATE FAULTED AT 65"	FEET	CASING  CEMENT  BROUND B  CASIN FILL  AREA MAD  by 8" Bit 1	inc-		PUMPING TEST Rhours Pumped 24 Type of Pump Used PAP Pumping Rate Gallons per Minute 25 WATER LEVEL Distance from land surface water: Before Famping 6 When Pumping 105 APPEARANCE OF WAT Clear 64 CLCAR Cloudy Taste Odor Height of Casing Above 1 Surface 1 PUMP INSTALLED Type 506Me25/6 Capacity Gallons per Minute 2 Gallons per Hour 120 Pump Column Length 106 REMARKS 15+WA+eR 40 2Nd WA+eR 40 2Nd W

### STATE OF MARYLAND

### DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkine University

BALTIMORE 18, MARYLAND

Blue Blazes No. 1

J × / 73

FR \$32795
APPLICATION FOR PERMIT TO DRILL WELL

An application must be submitted and	
Owner NATIONAL PARK SERVICE Street or R.F. D. CAtoctin Mt. PARK Post Office THUR MONT MA	Driller HARRIS BURES KOHL BROTHE, Street of R. F. D. 2/5+4 GREEN WAS B. Post Office HARRIS BURE PA
Quantity of Water Needed (G.P.M.) 20 Use for Water DoMESTIC Approximate Depth of Well (feet) 200 Method of Drilling to be used CHURN	Location of Well  County FREDERICK  Nearest Town IHURMONT  Distance from Town 3M/  Direction from Town N. W.
PERMIT TO DRILL WELL  (Permit to be returned to Driller)  NOT TO BE FILLED IN BY DRILLER  Permit No	Description of Location of Well  (This information should be definite enough to permit locating well on a county map)  Near what road Rt 77  On which side of road NORTH  (North, East, South, West)  Distance from road Sec Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow.
Owner Has Permit (Yes to Appropriate Water No  The applicant is herewith granted a permit to drill this well subject to the conditions stipulated.  Director  Director  Director  Special conditions that may apply:  wher's fer mit issued 2/17/55	NORTH  OFFICIAL  RESIDENCE  THARK OFFICE
11\$758	R+77

(ORIGINAL)

Delayed RePort Filed 6/26/89 4

## DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University
BALTIMORE 18, MARYLAND

WELL COMPLETION REPORT

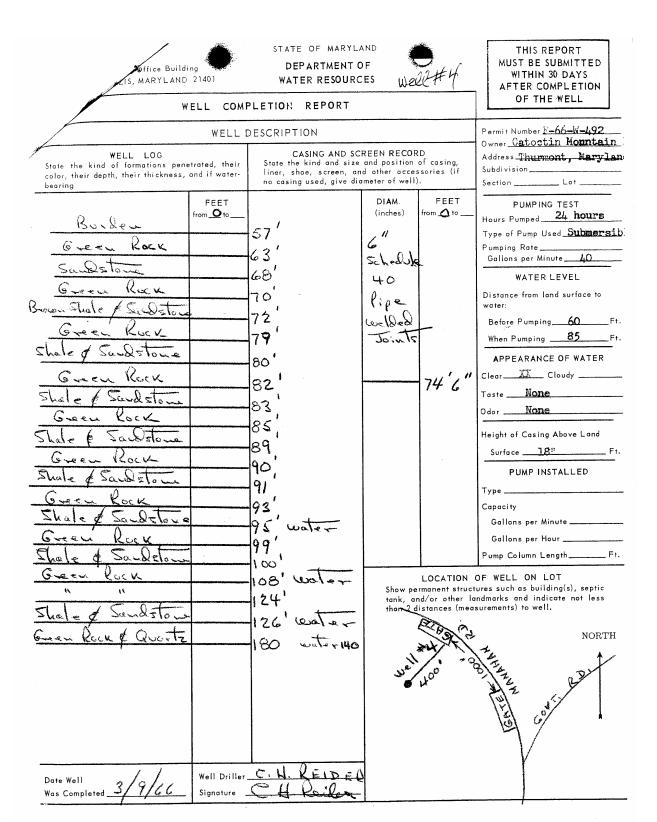
/- /	8 WELL DE	SCRIPT!ON		Permit Number 3 2795
WELL LOG State the kind of formations pe depth, their thickness, and if	CASING AND SC State the kind and size screen, and other accesso give diameter of well)		Name of Owner  Matiguah Utilia	
OVERBURDEN SAND ROCK COPPER ROCK	FEET, from C to LS 10' to 18	į.	ntam. FEET from	PUMPING TEST Hours Pumped Type of Pump Used Type of Pumping Rate Gallons per Minute
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				APPEARANCE OF WATER Clear CLCAR Cloudy Taste NENC Odor NENG
		Young t		Height of Casing Above Land Surface T F  PUMP INSTALLED  Type None  Capacity Gallons per Minute  Gallons per Hour
				Pump Column LengthFt. REMARKS
		a A		Well Was Completed Date 1/5/49 Well Driller Mand of Market Signature

## FREDERICH COUNTY DEPARTMENT OF HEALTH 12 East Church Street Winchester Hall Frederick, Maryland Pop

Poplar Grove No. 1

Meted by well driller. Copy to be sent to the Frederick County Health ment within fifteen (15) days after completion of drilling.

HEALTH DEPARTMENT COMPLETION CERTIFICATE	FOR PRIVATE WELLS
4-12-13-13-13-13-13-13-13-13-13-13-13-13-13-	Date <u>March</u> 28, 1966
Owner of Property Catoctin Mountain Park Drille Address Thurmont, Maryland Address	Roosevelt Avenue Opposite Lincoln Park
Exact location of property where well was drilled	•
If Subdivision: Name	
Permit No. F-66-W-492 (This is the n	umber issued by the Department of Geology.
Construction and performance characteristics of wel	<u>1</u>
(1) Diameter of largest bit8"	-
(2) Ground water encountered at	fu.
(3) At what depth was first vei. water encounte	red 95 ft. Cased of: Yes No. X
(4) Total depth of well 180 ft. Standing W	level in well blow ground surface when ft.
(5) Casing: Diamet asing 6" ID Leng	How were these joints sealed:  by welding $XX$ by treaded sleeve  round level $74\frac{1}{2}$ ft below ground level  t depth $74\frac{1}{2}$ ft.
(7) Yield of well: 40 gal. per min. No. of hou test 24	rs pump operated at this rate during hoursminutes.
(3) Log of materials encountered during drilling $\underline{B}$	
I hereby certify that the above information concern	well is true and correct.  Well Driller Dept of Geology, Mines and Water Resources License No. 92



TRIPLICATE

### THE FREDERICK COUNTY DEPARTMENT OF HEALTH

12 East Church Street
Winchester Hall
Frederick, Maryland

Poplar Grove No. 2

NOTE-- To be completed by well driller. Copy to be sent to the Frederick County Health Department within fifteen (15) days after completion of drilling.

HEALTH DEPARTMENT COMPLETION CERTIFIC	CATE FOR PRIVATE WELLS	
	Date <u>March 2</u>	8, 1966
Owner of Property Catoctin Mountain Park		
Address Thurmont, Maryland A	Roosevelt Avenue Opposite ddress York, Pennsylvania 174	
Exact location of property where well was drill	led <u>Foxville, on the Manahan Ro</u>	ad, beyond the Job
Corps Camp No. 3 well 300' west		
If Subdivision: Name	Block No.	Lot No
Permit NoF-66-W-489 (This is	the number issued by the Depart	ment of Geology.
Construction and performance characteristics o	<u>f_well</u>	
(1) Diameter of largest bit 8"	enterprise and the second second	
(2) Ground water encountered at None	fi	
(3) At what depth was first vein water end		esNo. X
(1) Total don'th of well 160 ft. Standin		
(5) Casing: Diametan . sasing6" I.D.	Length of metal casing4	6
Ara -usingjjoints watertight? Yes XX No	How were these joints set by welding XX	
Finished casing terminates 442 ft. ab	by treaded sleeve ove ground level $\frac{1}{2}$ ft	below ground level
(6) Well cement grouted: Yes XX No T (If answer to No. 6 is NO an acceptable e	o what depth $44\frac{1}{2}$ ft xplanation in detail is necessar	ry
(7) Yield of well: 35 gal. per min. No. o test	f hours pump operated at this re	ate duringminutes.
(3) Log of materials encountered during drill	ingBurden, Blue and green rock, gravel	brown shale and
I hereby certify that the above information co	ncerning this well is true and	correct.
	C. H. Kei	der
	Well Driller Dept. of Geology, Min	es and Water Resources
	License No. 92	

State Office Building
ANNAPOLIS, MARYLAND 21401

DEPARTMENT OF



MUST BE SUBMITTED
WITHIN 30 DAYS
AFTER COMPLETION
OF THE WELL

### WELL COMPLETION REPORT Permit Number F-66-W-489 WELL DESCRIPTION Owner Catoctin Mountain CASING AND SCREEN RECORD State the kind and size and position of casing, Address Thurmont, Maryli WELL LOG State the kind of formations penetrated, their Subdivision\_\_\_ liner, shoe, screen, and other accessories (if no casing used, give diameter of well). color, their depth, their thickness, and if water-\_\_ Lot \_ Section \_\_\_\_ FEET PUMPING TEST FEET from \_\_\_\_\_\_\_to . (inches) from Q to\_ Hours Pumped 24 6 11 Type of Pump Used Submersi BURDEN Pumping Rate <u>35</u> Gallons,per Minute 35 40 WATER LEVEL Pips 6007 Distance from land surface to Grave water: Before Pumping 55 When Pumping \_\_\_\_\_86 APPEARANCE OF WATER Clear XX Cloudy \_\_\_ 78 Taste None 87" Odor None 107 Height of Casing Above Land Gra 110 Surface 18" 160 PUMP INSTALLED Type \_\_ Capacity Gallons per Minute \_\_ Gallons per Hour \_ Pump Column Length\_ LOCATION OF WELL ON LOT Show permanent structures such as building(s), septic tank, and/or other landmarks and indicate not less than 2 distances (measurements) to well. CA NONPARA MORTH Well Driller C. H. Signature C

TRIPLICATE

## THE FREDERICK COUNTY DEPARTMENT OF HEALTH 12 Rast Church Street Winchester Hall Tim Brown No.

Frederick, Maryland

Jim Brown No. 1

To be completed by well driller. Copy to be sent to the Frederick County Health Department within fifteen (15) days after completion of drilling.

HEALTH DEPARTMENT COMPLETION CERTIFICATE FOR PRIVATE WELLS

DateApril 5, 1966
Owner of Property Catoctin Mountain Park Driller York Drilling Company, Inc. C. Reider
Roosevelt Avenue Opposite Lincoln Park Address Thurmont, Maryland Address York, Pennsylvania 17405
Exact location of property where well was drilled Foxville, on the Manahan Road, beyond the Job
Corps Camp No. 1 Well 1,100 ft. west of Manahan Road - Chestnut Camp Site.
If Subdivision: Name Block No Lot No
Permit No. F-66-W-490 (This is the number issued by the Department of Geology.
Construction and performance characteristics of well
(1) Diameter of largest bit 8"
(2) Ground water encountered atft.
(3) At what depth was first vei. water encountered 28 ft. Cased of: Yes No. xx
(4) Total depth of well 120 ft. Standing w level in well how ground surface when furnish 74 ft.
(5) Casing: Diameta Length of metal casing 27
How were these joints sealed: by welding
by treaded sleeve Finished casing terminates $\frac{1}{2}$ ft above ground level $\frac{25\frac{1}{2}}{2}$ ft below ground level
(6) Well cement grouted: Yes xx No To what depth 25½ ft. (If answer to No. 6 is NO an acceptable explanation in detail is necessary
(7) Yield of well: 74 gal. per min. No. of hours pump operated at this rate during test 24 hours 0 minutes.
(3) Log of materials encountered during drilling Hard grey and blue rock interbedded with grav
I hereby certify that the above information concerning this well is true and correct.
Well Driller Dept. of Geology, Mines and Water Resources
License No. 92
Σ



STATE OF MARYLAND

DEPARTMENT OF WATER RESOURCES



THIS REPORT
MUST BE SUBMITTED
WITHIN 30 DAYS
AFTER COMPLETION
OF THE WELL

WE	LL COMP	LETION	REPORT			
	WELL D	ESCRIPT	ION			Permit Number F-66-N-490 Owner Catoctin Fountain Pe Owner Thursont, Faryland
WELL LOG State the kind of formations penetr color, their depth, their thickness, at bearing	rated, their nd if water-	State the	ASING AND SCR kind and size o oe, screen, and gused, give dian	and position o Lother acces	of casing, sories (if	Owner Thurmont, Earyland Address Subdivision Lot Lot
Burden  Hard Grey Kock  Gravel - Control  Growy & Blue Kock  Brown & Blue Kock  Brown & Blue  Gock  WATER  Grand - water  Hord Blue Kock  Quard Z	FEET rom_Ω to	28' 32' 39' 41' 71' 77' 100'		6" ID	FEET from 0 to	PUMPING TEST Hours Pumped Type of Pump Used Submersibl Pumping Rate 74 Gal.Per.Mi Gallons per Minute 74  WATER LEVEL  Distance from land surface to water: Before Pumping 29 Ft. When Pumping 70 Ft.  APPEARANCE OF WATER  Clear XX Cloudy  Taste None  Odor None  Height of Casing Above Land Surface 12 Ft.  PUMP INSTALLED  Type Capacity Gallons per Minute Gallons per Hour Pump Column Length Ft.
Hard Green Rock		/20		tank, a	LOCATION ormanent struc and/or other I distances (mer	OF WELL ON LOT tures such as building(s), septic andmarks and indicate not less asurements) to well.  NORTH
Date Well Was Completed 3-29-66	Well Drille Signature	"=#	Reider	-		

12 East Church Street
Winchester Hall
Frederick, Maryland

Tim

### Jim Brown No. Z

NOTE-- To be completed by well driller. Copy to be sent to the Frederick County Health Department within fifteen (15) days after completion of drilling.

HEALTH DEPARTMENT COMPLETION CERT	IFICATE FOR PRIVATE WELLS
	Date <u>May 19, 1966</u>
Owner of Property Catoctin Mountain Park	Driller York Drilling Company, Inc. C. Reider
	Roosevelt Avenue Opposite Lincoln Park Address York, Pennsylvania 17404
	rilled Foxville, on the Manahan Road beyond the Job
Corps Camp No. 2 Well - 1,000 ft. west.	
	Block No. Lot No.
	is the number issued by the Department of Geology.
Construction and performance characteristic	. <u>-</u>
(1) Diameter of largest bit8"	8 "
(2) Ground water encountered at 28	28
(3) At what depth was first vei. water	encountered 53 ft. Cased of: Yes No. XX
(4) Total depth of well 250 ft. Stars	ding w r level in well b low ground surface when
(5) Casing: Diamet - assung 6"	Length of metal casing 46
ing Justingjjoints watertight? Yes	No. How were these joints sealed: by welding XX
Finished casing terminates $\frac{1}{2}$ ft.	by treaded sleeve above ground level $44\frac{1}{2}$ 441 below ground level
(6) Well cement grouted: Yes XX No (If answer to No. 6 is NO an acceptable	To what depth 442 ft. e explanation in detail is necessary
(7) Yield of well: 10 'gal. per min. No te	of hours pump operated at this rate during st 9 hours 15 minutes.
	illing Clay, Sand, Hard Blue Rock, Broken Formation
I hereby certify that the above information	concerning this well is true and correct.
	Well Driller Dept of Geology, Mines and Water
	Resources License No. 92

THE FREDERICK COUNTY DEPARTMENT OF HEALTE.

12 East Church Street

Winchester Hall

Frederick, Maryland

Head quarters Well

FE	- To be completed by well dr Department within fifteen	iller. Copy to b	e sent to	c the Frederick County Health n of drilling.
				FIGATE FOR PRIVATE WELLS
			Date _	4-3 7/
wner d	of Property lept of In	Address	AUSTII W RT. 7	N K. KEYSER, INC. FELL DRILLING FREDERICK, MD.
xact :	location of property where w	vell was drilled 👱	Treat	and the field
1	<i>A</i>	- A 10	· K	
f Sub	odivision: Name	Bloc	elt No.	Lot No
ermit	: No. FA-71-0428	(This i	s the nu	Let No.
onstr	ruction and performance chara	acteristics of wel	1	
1) D	Diameter of largest bit	<u> </u>		
	Ground water encountered at _		ft.	
	At what depth was first vein			it. Cased off: YesNo
4) T	Total depth of well 2018	. Standing water when not pumping	level in	n well below ground surface
(5) C	Casing: Diameter of casing (Are casing joints with	Length of rater tight? Yes	netal cas	How were these joints seal by welding by treaded sleeve and level
	TeAeT.			
(6) W	Well cement grouted: Yes (if answer to No. 6 is NO an	No To wha acceptable expla:	t depth _ nation in	ft. n detail is necessary
	Yield of well: // gal. per			
(8)	Log of materials encountered	during drilling	Hay X.	sed Stine Carddo
I here	reby certify that the above i	nformation concer	ning this  Livy  Driller  of Geo.	swell is true and correct.  Halley logy, Mines and Water Resour
		rice	nse No	

×4				
	$\varphi = \omega_{\alpha}^{(1)} f_{\alpha}^{(2)}$			

TREDERICK COUNTY HEALTH DEPARTS QUARTERS No.	5
Sek County Approval Certificate For Well Installation	
US DEPT OF JUTERIOR Driller AUCTIN GARVER	
D. NOO ON 10 DRIVE S.W. Street or R.F.D.	
LOE WAS HING TON PU 3.5 V +2 Post Office	
cion of property CATOCITAL MOUNTAIN NATIONAL PARK - EKE FXVILLE-	DEERFEE
IRD -RANGERS QUARTERS 45	
Block or If Subdivision: Name	
Well to furnish water to: HouseCommercial establishmentOthe	
Lot Size: Width (front) Depth (l. side) Area of lot (rear) (r. side)	
the place designated by the Health Department and as shown in the sketch below. completion certificate of this well must be filed by the driller, at the Health partment, within fifteen (15) days after completion of drilling. All well dril operations will be carried out in accordance with regulations of the State Depa of Health. Drilling at any other location, other than shown on sketch, VOIDS t approval certificate.  Date	De- ling rtment his
←TO FOXVILLE CHUPCH RD \$400' FOXVILLE PEERFIELD RD	·
NEW SENTEE ST. DETECT DESCRIPTION DESCRIPTION SENTER	
NOTICE = READ CAREFULLY	
The applicant for this permit is herewith advised that the property to be served this system is in an area shown to be in the Frederick County Comprehensive Wall and Sewerage Plan. The system for which the property to be served this system is in an area shown to be in the Frederick County Comprehensive Wall and Sewerage Plan. The system for which the property to be served this system is in an area shown to be in the Frederick County Comprehensive Wall and Sewerage Plan. The system for which the property to be served to be property to be served to be property to be served to be property to be served the property to be served to be property t	ry 1 ter ch ature
SEPTIC TANK  In spermit is issued is of a temporary in and the applicant is herewith advised it must be disconnected and connected to such future community system if and with the becomes available to serve the proper in this permit is issued is of a temporary and the applicant is herewith advised it must be disconnected and connected to such future community system if and with the becomes available to serve the proper in this permit is issued is of a temporary and the applicant is herewith advised it must be disconnected and connected to such future community system if and with the proper in the permit is issued is of a temporary and the applicant is herewith advised it must be disconnected and connected to such future community system if and with the proper in the permit is issued is of a temporary and the applicant is herewith advised it must be disconnected and connected to such future community system if and with the proper in the permit is issued is of a temporary and the applicant is herewith advised it must be disconnected and connected to such future community system if and with the proper in the permit is issued is of a temporary and the proper is a permit in the proper in the permit is a permit in the permit in the permit is a permit in the permi	any h <b>en</b>
The property described above has been inspected and the well site approved as s	hown
Date of approval 11-7-83 Sanitarian Educid Fort	,

SEQUENCE NO.						
C 1 09830 (MDE USE ONLY)	SPANSOF MARYLAND WELL COMPLETION REPORT FILL IN THIS FORM COMPLETELY BEASE TYPE	Jim Brown Na.3				
ST/CO USE ONLY DATE WELL COMPI	PLEASE TYPE  LETED Depth of Well	FROM "PERMIT TO POSITION IN				
DATE Received MM DD YY My//2 <sup>D2</sup> //0	22 800 26	FROM "PERMIT TO DRIES WELL"  F.R94 - 3010				
8 13 15	20 (TO NEAREST FOOT)	28 29 30 31 32 33 34 35 36 37				
lest name 100 m / m	MOUNTAIN PARK	à				
STREET OR RFD Y I I I I I I I I I I I I I I I I I I	/	icx VIIIe				
WELL LOG	SECTION	LOT				
Not required for driven wells	WELL HAS BEEN GROUTED (Circle Appropriate Box)	C 3				
STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING	TYPE OF GROUTING MATERIAL (Circle one)	PUMPING TEST				
DESCRIPTION (Use FEET check if water	CEMENT CM BENTONITE CLAY BC	HOURS PUMPED (nearest hour)				
additional sneets if needed) FROM TO bearing	NO. OF BAGS 46 26 NO. OF POUNDS 246 49 O	PUMPING RATE (gal. per min.)				
400 Sil 02	CALLONS OF WATER 15/0	METHOD USED TO MEASURE PUMPING RATE Bucket				
Shale-1 21/0	DEPTH OF GROUT SEAL (to nearest foot) from ft. to 30 ft.	MEASURE PUMPING RATE				
Green Mountain	from 48 TOP 52 ft. to 54 BOTTOM 58 ft. (enter 0 if from surface)	WATER LEVEL (distance from land surface)				
ROCK 10 260 -	casing CASING RECORD	BEFORE PUMPING $\frac{50}{17}$ ft.				
Line Stone 260 315	types insert appropriate STEL CONCRETE	WHEN PUMPING $\frac{800}{22}$ ft.				
	code below PL OT	TYPE OF PUMP USED (for test)				
Quitzs 315 320	MAIN Nominal diameter Total depth	A air P piston T turbine				
great mountain 320 500	CASING top (main) casing of main casing TYPE (nearest inch)! (nearest foot)	C centrifugal R rotary O (describe				
1 Lock 300 300	5+ 8 62	C centrifugal R rotary 0 (describe below)				
Line Stut 500 580	60 61 63 64 66 70	J jet S submersible				
	E OTHER CASING (if used) A diameter depth (feet)	21 21				
91884 140W/412	H inch from to	PUMP INSTALLED				
100k 500 700	88	DRILLER INSTALLED PUMP YES (NO) (CIRCLE) (YES or NO)				
	N	IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.				
Blue Koch 700 800	screen type SCREEN RECORD	TYPE OF PUMP INSTALLED				
	or open hole ST BR HO	PLACE (A,C,J,P,R,S,T,O) 29 IN BOX 29.				
	insert STEEL BRASS OPEN appropriate BRONZE HOLE	CAPACITY: GALLONS PER MINUTE				
	code below PL OT	(to nearest gallon) 31 35				
	PLASTIC OTHER	PUMP HORSE POWER  37 41				
NUMBER OF UNSUCCESSFUL WELLS:	C 2 DEPTH (nearest ft.)	PUMP COLUMN LENGTH (nearest ft.)				
WELL HYDROFRACTURED Yes YES	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	CASING HEIGHT (circle appropriate box and enter casing height)				
CIRCLE APPROPRIATE LETTER	C H 2 23 24 26 30 32 36	49 above LAND SURFACE				
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED	S C 3	below (nearest)				
E ELECTRIC LOG OBTAINED,  TEST WELL CONVERTED TO PRODUCTION	R 38 39 41 45 47 51	49 50 51				
E SLOT SIZE 1 2 3 LOCATION OF WELL ON LOT						
I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 28.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE	DIAMETER (NEAREST OF SCREEN INCH)	AND INDICATE NOT LESS THAN TWO DISTANCES				
CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.	56 60 from to	(MEASUREMENTS TO WELL)				
DRILLERS LIC. NO.1 MV D640	GRAVEL PACK	per plat				
Dance 7 Fasterlan	F WELL DRILLED WAS FLOWING WELL	7				
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)	INSERT F IN BOX 68 68					
C mu/2421	MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)					
LIC. NO.1 /ITE U I 2.	T (E.R.O.S.) W Q	1. 1. 1. 1. 1. 2				
SITE SUPERVISOR (sign of driller or journeyman	70 72 74 75 76					

en e			

CALL GENERAL AND RESERVED	STATEMOTE MATERAL AND WELL COMPLETION REPORT FILL IN THIS FORM COMPLETELY PLEASE TYPE	Jim Brown No. 4
ST/CO USE ONLY DATE Received  DATE WELL CO	PLETED Depth of Well	PERMIT NO.
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$2^{\text{Y}}$ 22_500 26	FROM "PERMIT TO DRILL WELL"
1000000	TO NEAREST FOOT)	28 29 30 31 32 33 34 35 36 37
STREET OR RED last name MAN		MAKMAT
	SECTIONTOWN	LOT UR // 2
WELL LOG	GROUTING RECORD Yes no	[C 3]
Not required for driven wells	WELL HAS BEEN GROUTED (Circle Appropriate Box)	1 2
STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING	TYPE OF GROUTING MATERIAL (Circle one)	PUMPING TEST
DESCRIPTION (Use additional sheets if needed) FROM TO bear	CEMENT C M BENTONITE CLAY BC	HOURS PUMPED (nearest hour)
	NO. OF BAGS 4627 NO. OF POUNDS 357450 GALLONS OF WATER	PUMPING RATE (gal. per min.)
	DEPTH OF GROUT SEAL (to nearest foot)	METHOD USED TO MEASURE PUMPING RATE Bucket
Shaley 2 12	from 48 TOP 52 ft. to 54 BOTTOM 58 ft.	WATER LEVEL (distance from land surface)
Sreed mountain	(enter 0 if from surface)	
Green mountain Rock 12 142	casing types insert ST CO	BEFORE PUMPING $\frac{50}{17}$ ft.
	(insert appropriate code STEEL CONCRETE code	WHEN PUMPING 500 ft.
Quitzs?	below PL OTHER	TYPE OF PUMP USED (for test)
Brown Shile 142 148	MAIN Nominal diameter Total depth	A air P piston T turbine
	CASING top (main) casing of main casing TYPE (nearest inch)! (nearest foot)	C centrifugal R rotary O (describe
Blue Stone 148 275	<u> </u>	centrifugal R rotary (describe below)
	60 61 63 64 66 70 E OTHER CASING (if used)	J jet S submersible
Rock 275 315	A diameter depth (feet) H inch from to	21
	C	PUMP INSTALLED DRILLER INSTALLED PUMP YES NO
Blue 5/w 15 315 380	5 N	(CIRCLE) (YES or NO)
STEEN MOUNTAN	G	IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
Rock 300 500	screen type SCREEN RECORD or open hole OLT DEP	TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) 29
	insert STEEL BRASS OPEN	IN BOX 29.
	appropriate code below BRONZE PL OT	CAPACITY: GALLONS PER MINUTE
	PLASTIC OTHER	(to nearest gallon) 31 35
NUMBER OF UNSUCCESSFUL WELLS:	C 2 DEPTH (nearest ft.)	PUMP HORSE POWER  PUMP COLUMN LENGTH  37  41
ves no	1 2/ha 55 500	(nearest ft.)
WELL HYDROFRACTURED Y	A 8 9 11 15 17 21	CASING HEIGHT (circle appropriate box
CIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED	C H 2 23 24 26 30 32 36	above LAND SURFACE
WHEN THIS WELL WAS COMPLETED	S C 3	below 2 (nearest)
P TEST WELL CONVERTED TO PRODUCTION WELL	R 38 39 41 45 47 51	49 foot)
I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED	E SLOT SIZE 1 2 3	A LOCATION OF WELL ON LOT SHOW PERMANENT STRUCTURES
ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HERBIN IS ACCURATE AND CONFORMATION PRESENTED	DIAMETER (NEAREST OF SCREEN INCH)	AND INDICATE NOT LESS THAN
HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.	56 60 from to	TWO DISTANCES (MEASUREMENTS TO WELL)
DRILLERS LIC. NO. 1 MW D 040	GRAVEL PACK	per plat
DRILLERS SIGNATURE CANTENDARY	IF WELL DRILLED WAS FLOWING WELL	<b>y</b>
(MUST MATCH SIGNATURE ON APPLICATION)	MDE USE ONLY	
LIC. NO. 1/M/V D48/	(NOT TO BE FILLED IN BY DRILLER) T (E.R.O.S.) W Q	10/15/02
llite	70 72	
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)	TELESCOPE LOG 74 75 76 CASING INDICATOR OTHER DATA	

	SEQU	NCE NO.	STATE OF MARYLAND	
[c]1 3784		SE ONLY)	WELL COMPLETION REPORT	Tke Smith Test Hole
1 2 3 (THIS NUMBER IS TO BE I			FILL IN THIS FORM COMPLETELY	Tue > wild 1501 11915
IN COLS. 3-6 ON ALL CAP		TIL COMPL	PLEASE TYPE  FTED Depth of Well	PERMIT NO.
DATE Received	DATE W	ELL COMPL	Y 22 <b>2</b> /1/) 26	FROM "PERMIT TO DRILL WELL"  FR - 95 - 0/25
8 13	15/	19/04	20 (TO NEAREST FOOT)	28 29 30 31 32 33 34 35 36 37
7	ATD CTI	N W	OUNTAIN PARK	
OWNER	last name	PANA H	AN ROAD first hame TOWN PO	xville
SUBDIVISION	KE S	n/JIH	SITE SECTION W-1	LOT CAMP 4
	LOG		GROUTING RECORD NO NO	C 3
	or driven wells		WELL HAS BEEN GROUTED (Circle Appropriate Box)	PUMPING TEST
STATE THE KIND OF FORMA COLOR, DEPTH, THICKNES	ATIONS PENETRA SS AND IF WATER		TYPE OF GROUTING MATERIAL (Circle one)	HOURS PUMPED (nearest hour)
DESCRIPTION (Use additional sheets if needed)	FEET FROM T	check if water bearing	CEMENT CIM BENTONITE CLAY BC	
	0 1	Journey	NO. OF BAGS 52 NO. OF POUNDS 5220 GALLONS OF WATER 5200	PUMPING RATE (gal. per min.)
top soir			DEPTH OF GROUT SEAL (to nearest foot)	METHOD USED TO MEASURE PUMPING RATE Buchet
green mount pod	1 4		from 48 TOP 52 ft. to 54 BOTTOM 58 ft,	WATER LEVEL (distance from land surface)
Lose poch	4 7		(enter 0 if from surface)	BEFORE PUMPING 50 ft.
Clay	7 10		casing types types to the control of	17 20
green mount Rock	10 16	1	(appropriate) STEEL CONCRETE	WHEN PUMPING 20 tt.
gravel	16 10		code below PL OT OTHER	TYPE OF PUMP USED (for test)
Lose Rocks cky	'		MAIN Nominal diameter Total depth	P piston T turbine
gravel	' '   ~	1 _	CASING top (main) casing of main casing TYPE (nearest inch)! (nearest foot)	C centrifugal R rotary O (describe below)
1	25 2	3 /	$\frac{5k}{60} = \frac{8}{63} = \frac{80}{66} = \frac{70}{70}$	2/ 2/ 2/
green mont rock	128 53	2	E OTHER CASING (if used)	J jet S submersible
oped	52 50	/	A diameter depth (feet) C inch from to	
green mount Rock	54 8	2	C	PUMP INSTALLED  DRILLER INSTALLED PUMP  YES  NO
Fractures	82 8	3 /	S ! N	(CIRCLE) (YES or NO)
green mout Rock green mont Rock Quitzs	83 38	ا	Ğ —	IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
green mont rock	385 60		screen type SCREEN RECORD	TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O)  29
Quitzs	387	_	or open hole ST BR HO	IN BOX 29.
Blue slote	600 6	/3	appropriate BRONZE HOLE COde	CAPACITY: GALLONS PER MINUTE
green mouth pock	175 80	0	below PLASTIC OTHER	(to nearest gallon) 31 35
LOCK				PUMP HORSE POWER  37 41
NUMBER OF UNSUCCESS	FUL WELLS:	0	C 2 DEPTH (nearest ft.)	PUMP COLUMN LENGTH (nearest ft.)
	yes		1 Ho 78 800	CASING HEIGHT (circle appropriate box
WELL HYDROFRACTURED			A 8 9 11 15 17 21	and enter casing height)
CIRCLE APPRO			H 2 23 24 26 30 32 36	A49 } EAND SOTT ACE
A WELL WAS ABANDO WHEN THIS WELL WAS	S COMPLETED	יט	S C 3	below g (nearest) foot)
E ELECTRIC LOG OBTAIN		TION	R 38 39 41 45 47 51 E	49 50 51  A LOCATION OF WELL ON LOT
WELL			E SLOT SIZE 1 2 3	SHOW PERMANENT STRUCTURE SUCH AS
I HEREBY CERTIFY THAT THIS W ACCORDANCE WITH COMAR 26.0 IN CONFORMANCE WITH ALL CO	4.04 WELL CONST	RUCTION" AND IN THE ABOVE	DIAMETER (NEAREST OF SCREEN INCH)	N BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS
CAPTIONED PERMIT, AND THAT HEREIN IS ACCURATE AND CO KNOWLEDGE.	THE INFORMATION THE	N PRESENTED BEST OF MY	56 60 from to	THAN TWO DISTANCES (MEASUREMENTS TO WELL)
	MWDD	40	GRAVEL PACK	
DRILLERS LIC. NO. 1	1 71 <del>1</del>	200	IF WELL DRILLED WAS FLOWING WELL	pect
DRILLERS SIGNATURE (MUST MATCH SIGNATURE	ON APPLICATION	may	INSERT F IN BOX 68 68	1
(MUST MATCH SMINATURE	NWD H	81	MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)	
LIC. NO.1		<u> </u>	T (E.R.O.S.) W Q	₩
1 (i) Earn	of dullian in	nàimae	70 72 74 75 76	
SUPERVISOR (sign.			TELESCOPE LOG 74 75 76 CASING INDICATOR OTHER DATA	

	HANNE SAN	MarraeningTone
C 1 3783 SEQUENCE NO. (MDE USE ONLY)  1 2 3 (THIS NUMBER IS TO BE PUNCHED	STATE OF MARYLAND WELL COMPLETION REPORT FILL IN THIS FORM COMPLETELY	Test Hole at Blue Blazes
IN COLS. 3-6 ON ALL CARDS)  ST/CO USE ONLY  DATE WELL COM	PLEASE TYPE	DEDUIT NO
DATE Received MM DO YY	/YY	PERMIT NO. FROM "PERMIT TO DRILL WELL"
8 13 25/14/0	22 ( ) (TO NEAREST FOOT) 26	FR - 95 - 0/26 28 29 30 31 32 33 34 35 36 37
lest name O = h .	TOUNTAW PARK	**************************************
STREET OR RFD PARA SUBDIVISION MISTY MUT	CENTRAL RETTO TOWN	FoxVille
WELL LOG	SECTION U # 1	LOT CAMP!
Not required for driven wells	WELL HAS BEEN GROUTED (Circle Appropriate Box)	C 3
STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING	TYPE OF GROUTING MATERIAL (Circle one)	PUMPING TEST HOURS PUMPED (nearest hour)
DESCRIPTION (Use additional sheets if needed) FROM TO bearing	CEMENT CEM BENTONITE CLAY BC  NO. OF BAGS 22 NO. OF POUNDS 25 45	8 9
top 5014 0 2	GALLONS OF WATER 132	PUMPING RATE (gal. per min.)  11  METHOD USED TO
green mountrook 2 12	DEPTH OF GROUT SEAL (to nearest foot) 23	MEASURE PUMPING RATE Buchet
C/4 12 34	from 48 TOP 52 ft. to 54 BOTTOM 58 ft. (enter 0 if from surface)	WATER LEVEL (distance from land surface)
Soft mul 14 24	casing CASING RECORD	BEFORE PUMPING $\frac{50}{17}$ ft.
green mount Rock 35 120	appropriate STEEL CONCRETE	WHEN PUMPING 60 ft.
Fractured	code below PLASTIC OTHER	TYPE OF PUMP USED (for test)
Creal manda	MAIN Nominal diameter Total depth	A ain P piston T turbine
'~'   //0   ~	TYPE (nearest inch)! (nearest foot)	C centrifugal R rotary O other (describe below)
great mount rock 410 428	SF 8 80 60 61 63 64 66 70	J jet S submersible
Quit25 710 428 -	E OTHER CASING (if used) A diameter depth (feet) H inch from to	27 27
G-only	H inch from to	PUMP INSTALLED DRILLER INSTALLED PUMP YES (NO)
Green mount 425 600	S	(CIRCLE) (YES or NO)
	screen type SCREEN RECORD	IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
	screen type or open hole ST BR HO	TYPE OF PUMP INSTALLED  PLACE (A,C,J,P,R,S,T,O)  IN BOX 29.  29
	insert STEEL BRASS OPEN Appropriate BRONZE HOLE	CAPACITY:
	code below PLASTIC OTHER	(to nearest gallon) 31 35
	C 2 DEPTH (nearest ft.)	PUMP HORSE POWER  37 41
NUMBER OF UNSUCCESSFUL WELLS:	1 2 1 4 78 600	PUMP COLUMN LENGTH (nearest ft.)
WELL HYDROFRACTURED YES N	E T 7 T T T T T T T T T T T T T T T T T	CASING HEIGHT (circle appropriate box
CIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED	H 2 H 23 24 26 30 32 36	above above LAND SURFACE
WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED	C 3 R 38 39 41 45 47 51	below (nearest) foot)
P TEST WELL CONVERTED TO PRODUCTION WELL	E	A LOCATION OF WELL ON LOT
I MEDERY CERTIES THAT THIS WELL THE REEN CONSTRUCTED IN	N 5251 5122 1 2 3	SHOW PERMANENT STRUCTURE SUCH AS
ACCORDANCE WITH COMAR 28.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY	DIAMETER	BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES
KNOWLEDGE.	from to	(MEASUREMENTS TO WELL 131)
DRILLERS LIC. NO. 1 MJUD 040 1	GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL	cell x 240' well
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)	INSERT F IN BOX 68 68  MDE USE ONLY	To XX
LIC. NO. 1 MW D \$48/1	MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)  T (E.R.O.S.) W Q	1 his is 2
10 Em	70 72	The map
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)	TELESCOPE LOG 74 75 76 CASING INDICATOR OTHER DATA	7 8 0303   3
	Onding Maion Office DATA	1 "

ACT CALLS IN THE STATE OF THE S	S)(/\U=(0);\\/\\\/\\/\\/\\\\\\\\\\\\\\\\\\\\\\\\	
1 2 3 6 (THIS NUMBER IS TO BE PUNCHED	WELL COMPLETION REPORT FILL IN THIS FORM COMPLETELY	Blue Blazes No. 2
IN COLS. 3-6 ON ALL CARDS)	PLEASE TYPE	
ST/CO USE ONLY DATE WELL COM	PLETED Depth of Well	FROM "PERMIT TO DRILL WELL"
8 13 8/14/00	2 66 26 20 (10 NEAREST FOOT)	E/C - 95 - 050 3
OWNER CATOCTIN MOU	STAIN PARIC	
STREET OR RFD	AA A	Hurmont
SUBDIVISION MISTY MOUNT	SECTION CAMP / GROUTING RECORD (708) 110	LOT [We// 2
Not required for driven wells	WELL HAS BEEN GROUTED (Circle Appropriate Box)	C 3
STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING	TYPE OF GROUTING MATERIAL (Circle one)	PUMPING TEST 25
DESCRIPTION (Use FEET if water additional sheets if needed) FROM TO bearing	(   C   D   C   D   C   D   C   D   C   C	HOURS PUMPED (nearest hour)
La Soil	NO. OF BAGS NO. OF POUNDS 2500	PUMPING RATE (gal. per min.)
1	DEPTH OF GROUT SEAL (to nearest foot)	METHOD USED TO MEASURE PUMPING RATE ORFICE
Shalf green mountruck 5 25	from 48 TOP 52 ft. to 54 BOTTOM 58 ft.	WATER LEVEL (distance from land surface)
10.04	(enter 0 if from surface)	DEFORE NAME 43
2, 2,	casing CASING RECORD types	BEFORE PUMPING 7 20 ft.
green mount pick 27 170	insert appropriate STEEL CONCRETE	WHEN PUMPING 155 ft.
great mount kock	code below PLASTIC OTHER	TYPE OF PUMP USED (for test)
Quitz; 170 300 V	MAIN Nominal diameter Total depth	A and P piston T turbine
	CASING top (main) casing of main casing TYPE (nearest inch)! (nearest foot)	C centrifugal R rotary O (describe
green mount rock 300 660	5 8 60 61 83 64 66 70	27 below)
	60 61 63 64 66 70 E OTHER CASING (if used)	J jet S submersible
	A diameter depth (feet) H inch from to	
	Ř —— —————————————————————————————————	DRILLER INSTALLED PUMP YES (NO)
		(CIRCLE) (YES or NO)
		IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
	screen type or open hole SIT BIR HIO	TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) 29
	insert STEEL BRASS OPEN	IN BOX 29. CAPACITY:
	code below BRONZE HOLE	GALLONS PER MINUTE (to nearest gallon) 31 35
	PLASTIC OTHER	PUMP HORSE POWER
NUMBER OF UNSUCCESSFUL WELLS:	C 2 DEPTH (nearest ft.)	PUMP COLUMN LENGTH
yes no	F1 HO 58 660	(nearest ft.)
WELL HYDROFRACTURED Y	A 8 9 11 15 17 21	CASING HEIGHT (circle appropriate box and enter casing height)
CIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED	H <sup>2</sup> 23 24 26 30 32 36 S	49 LAND SURFACE
WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED	C 3	below 2 (nearest)
P TEST WELL CONVERTED TO PRODUCTION WELL	E	A LOCATION OF WELL ON LOT
I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND	DIAMETER (NEAREST	SHOW PERMANENT STRUCTURE SUCH AS
I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 20 A.0.4 "WELL CONSTRUCTION" AND IN CONNORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE OF THE WORLD AND ALL CONDITIONS STATED IN THE ABOVE OF THE WORLD AND ALL CONDITIONS OF THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR COURAITE AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WORLD AND COMPLETE TO THE BEST OF MY WARDING FOR THE WARDING FOR	OF SCREEN (NEAREST)	BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES
1//	from to	(MEASUREMENTS TO WELL)
DRILOTRS LIC. NO. 1 MM D. 0.40	GRAVEL PACK	N col x cen
DRILLERS SHENATURE (MUST MATCH DIGNATURE ON APPLICATION)	WAS FLOWING WELL INSERT F IN BOX 68 68	yell 300 ( tower
(MUST MATOR SIGNATURE ON APPLICATION)  LIC. NO. 1 M. W/D 481	MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)	this is
LIC. NO.1 VALVOD 7.8 1	T (E.R.O.S.) W Q	e the mast
SITE SUPERVISOR (sign. of driller or journeyman	70 72 74 75 76	3 of 126 €
responsible for sitework if different from permittee)	TELESCOPE LOG 74 75 76 CASING INDICATOR OTHER DATA	۵

### L. FRANKLIN EASTERDAY, INC FIELD DATA SHEET

Date:

Page 1 of 1

Type of Test 24 HOUR PUMPING TEST

State Tag
Location:

Start Time:

M.P. Above Ground:

M.P. Above Ground:

	ft.w	ell,	gj	om -							
Min	Time	Level	GPM	Min	Time	Level	GPM	Min	Time	Level	GPM
1_	9:21	48	23	35	9:55	93.1	23	13hrs	10:20	148.2	<b>.53</b>
2	922	52.8	23.	40	1	95,9	11 11	14hrs	11:20	1490	2.5
3	9:23	56.4	23	45	16:05	97.9		15hrs	12:20	149.6	25
4	9:24	59.3	23	50	10:50	100-5		16hrs	4	150.2	
5	9:25	622	23	55	16:15	101.9	23	18hrs	1	151.7	<b>M</b>
6	9:26	65.6	22	60	10:20	103.6	23	20hrs	5.20	153.0	J. J.
7	9:27	66.8	23	90	10:50	112-2	<i>W</i> 3	22hrs	7:20	154.2	
8	9:28	68.6	23	120	11:20	119.6	23	24hrs	9:20	1545	23
9	9:29	70.6	23	150	11.50	123.5	23	,	10:40	155.2	23
10	9:30	72.2	23	180	12:20	127,2	_3				
12	9:32	75.0	23	210	12:50	130,6	83				
14	9:34	77.2	23	240	1:20	133, 8°	23				
16	9:36	79.5	23	300	2:20	137.6	22				
18	9:38	81.5	23	360	3:20	140.15	23				
20	9:40	83.2	23	420	4:20	141.95	23	,			
22	9:42	85.0	and Si	480	5:20	1413,40	23				
24	9:44	86.6	e = 1 (2)	9hrs	6:20	1446	33				
26	9,46	88.1	الم السبع	10hrs	7:20	145.7	23				
_28		87.3	13	11hrs	8:20	146.7	23				
30	9:50	90.6	53	12hrs	9:20	147.3	23				
						-		:			
			14.								
			1.								

### L. FRANKLIN EASTERDAY, INC FIELD DATA SHEET

Date: 10/12	/36		Page 1 of 1	
	Recovery Check	Owner:	A.	
State Tag	F144 13 0000	Owner		
Location:	Misty MOUNT	tl 2	Water Level Below (M.P):	
Start Time:	,		M.P Above Ground: 2'	

Min Time Level GPM Min Time Level GPM Min Time Level G  1		ft.we	ell,	gr	om							
2 /5/72 /7/2.65 40 //.35 /06.4 14hrs 3 /5/75 /38.0 45 //.25 /05.4 15hrs 4 /5/76 /33.8 50 //.35 /05.4 15hrs 5 /5/76 /33.8 50 //.35 /03.3 18hrs 6 /0.76 /2.8 60 //.45 /02.4 20hrs 7 /5.77 /25.65 90 /2.75 9.8 22hrs 8 /5.77 /25.65 90 /2.75 94.9 24hrs 9 /5.77 /25.65 90 /2.75 94.9 24hrs 9 /5.77 /21.70 150 //.55 94.9 16/13/06/06/07 44.67 10 /5.55 /20.30 180 //.45 89.9 12 /5/52 /18.0 210 2//0 87.5 14 /5/57 /16.1 240 2//0 85.8 16/13/55 /17.55	Min	Time	Level	GPM	Min	Time	Level	GPM	Min	Time	Level	GPM
3   13   13   13   10   15   10   15   15   15   15   15	1	10:71	1429		35	11:15	107.6		13hrs		-	
4 10.44 133.8 50 1130 104.2 16hrs 5 2.47 132.8 55 11.38 103.3 18hrs 6 10.46 128 60 1140 102.4 20hrs 7 125.55 90 12.40 98.2 22hrs 8 1248 123.55 120 12.40 94.9 24hrs 9 12.170 150 150 120 92.2 1013 106 10107 44 pt 10 12 50 120.30 180 1140 87.5 114 1258 118.0 210 210 210 87.5 14 1258 114.45 300 18 12.58 113.15 360 20 11.20 112.10 420 22 11.25 110.45 9hrs 26 11.65 109.35 10hrs 28 11.65 109.35 10hrs 30 11.70 108.75 12hrs	2	19:42	142.65		40	1/1.20	106.4		14hrs			
5 0.46 /30.8 55 //35 103.3 18hrs 6 10.46 /28 60 //40 /02.4 20hrs 7 10.47 /25.65 90 10.40 98.2 22hrs 8 10.48 123.55 120 10.49 94.9 24hrs 9 10.49 121.70 150 1/0 92.2 10/13/06/10/07 44 pt 10 10.50 120.30 180 1/40 87.5 12 10.52 118.0 210 2/10 87.5 14 10.58 1/6.1 240 2:40 85.8 16 10.55 114.45 300 18 10.58 1/3.15 360 20 11/00 112.10 420 22 11.00 112.10 420 24 11/04 110.45 9hrs 26 11.06 109.85 10hrs 28 11/08 109.3 11hrs 30 11/70 108.75 12hrs	3. ~	13:43	1380		45	11:25	105.4		15hrs	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
6 10.46 128 60 1.40 102.4 20hrs 7 12815 90 12.40 98.2 22hrs 8 12.47 123.55 120 12.49 94.9 24hrs 9 12.470 150 120.30 180 1.40 89.9 12 10.52 118.0 210 2.10 87.5 14 10.55 114.45 300 18 12.55 113.15 360 20 11.20 112.10 420 22 11.20 111.25 480 24 11.66 109.85 10hrs 26 11.67 109.85 10hrs 28 11.67 109.3 11hrs 30 11.70 108.75 12hrs	4	10.44	133,8		50	11:30	104.2		16hrs			
7 /2 47 /25	5	10:45	130.8		55	11:35	103.3		18hrs			
8 10 48 123.55 120 120 94.9 24hrs 9 10.49 121.70 150 1.0 92.2 1013 106 10:07 44 pr 10 10 50 120.30 180 1.40 89.9 12 10.52 118.0 210 2:10 87.5 14 10.54 116.1 240 2:40 85.8 16 10.55 114.45 300 18 10.55 113.15 360 20 11.20 112.10 420 22 11.25 480 24 11.47 110.45 9hrs 26 11.05 109.85 10hrs 28 11.05 109.3 11hrs 30 11.70 108.75 12hrs	6	10:96	128		60	11140	102.4		20hrs			
9 12.44 121.70 150 150 170 92.2 1013 106 10:07 44 pt  10 13 50 120.30 180 1.40 89.9  12 10.52 118.0 210 2:10 87.5  14 10.54 116.1 240 2:40 85.8  16 13.55 114.45 300  18 13.58 113.15 360  20 17.00 112.10 420  22 17.42 111.25 480  24 17.44 110.45 9hrs  26 17.06 109.85 10hrs  28 17.06 109.3 11hrs  30 17.70 108.75 12hrs	7	13.47	12515		90	12:10	98.2		22hrs			
10	8	10.48	123.55		120	12:40	94.9		24hrs			
10	9	10:49	121,70		150	1110	92.2		10/13/06	10:07	44 PT	
14 10.58 116.1 240 2:40 85.8  16 10.56 114.45 300  18 10.58 113.15 360  20 11:00 112.10 420  22 11:02 111.25 480  24 11:08 109.85 10hrs  28 11:08 109.3 11hrs  30 11:70 108.75 12hrs	10	1050	120,30		180	1.40	89.9					
16 /3.55 /14.45 300  18 /3.58 /13.15 360  20 //.00 /12.10 420  22 //.02 /11.25 480  24 //.06 /109.85 10hrs  28 //.06 /109.3 11hrs  30 ///0 /108.75 12hrs	_12_	10.152	118.0		210	2:10	87.5					
18 /3.5% //3.15 360  20 //.30 //2.10 420  22 //.32 //1.25 480  24 //.34 //0.45 9hrs  26 //.36 109.35 10hrs  28 //.36 109.3 11hrs  30 //.70 108.75 12hrs	14	10:54	116.1		240	2:40	85.8					
20 1/30 1/2.10 420  22 1/32 111.25 480  24 1/34 110.45 9hrs  26 1/36 109.85 10hrs  28 1/36 109.3 11hrs  30 1/70 108.75 12hrs	16	13:55	114.45		300							
22 //. 2 111.25 480  24 1/. 4 110.45 9hrs  26 1/. 8 109.85 10hrs  28 1/. 8 109.3 11hrs  30 1// 0 108.75 12hrs	18	10:58	113.15		360							
24 1/4 110.45 9hrs  26 1/6 109.85 10hrs  28 116 109.3 11hrs  30 110 108.75 12hrs	20	11:00	112,10		420							
24 //. 4 //. 4 //. 4 //. 4 //. 9hrs  26 //. 6 //. 6 //. 109.85 10hrs  28 //. 6 //. 109.3 11hrs  30 /// 108.75 12hrs	_22	11:02	111.25		480			<u>.</u>				
28 1/108 109.3 11hrs 12hrs 12hrs 12hrs	24				9hrs							
30 1/70 108.75 12hrs	26				10hrs							
	28	11:08	109.3		11hrs							
	_30	11.70	108.75		12hrs							
	-											
					***							

STATE FOR MARY LAND WELL COMPLETED  STOOL BE CONTROLL CORREST  FILE IN THIS FORM COMPLETED  Depth of Well  STOOL BE CONTROLL CORREST  FILE IN THIS FORM COMPLETED  Depth of Well  STOOL BE CONTROLL CORREST  THE CONTROLL CORREST  FILE IN THIS FORM COMPLETED  Depth of Well  STOOL BE CONTROLL CORREST  TOWN THE CONTROLL CORREST  FROM - PERMIT TO DETAIL WELL  OF SOOL BETT TOWN THUS FORM COMPLETED  STATE FOR FROM  STOOL BETT TOWN THUS FORM COMPLETED  STOOL BE					
PLEASE TYPE  Depth of Well  DATE Received w  TOWNER  DATE Received w  TOWNER  OWNER  DATE Received w  TOWNER  STREET OR RED  WELL LOO  Not required for driven wells  Early The Reco or Prometrices Separation to the Separation of	1 2 3	(MDE USE		STATE OF MARYLAND  WELL COMPLETION REPORT  FILL IN THIS FORM COMPLETELY	Test Hole at Bldg. 167
DATE WELL COMMERTED  DATE WELL COMMERTED  TO MANAGER FROM  TO FROM  TO FROM  TO MANAGER FROM  TO FROM  TO MANAGER FROM  TO FROM  TO FROM  TO MANAGER FROM  TO FROM  TO FROM  TO FROM  TO FROM  TO MANAGER FROM  TO FROM  TO FROM  TO MANAGER FROM  TO FROM	IN COLS. 3-6 ON ALL CAR	IDS)		PLEASE TYPE	PERMIT NO
TOWNER		DATE WEL	L ÇOMPL	ETED Depth of Well	FROM "PERMIT TO DRILL WELL"
OWNER  STREET OR REP  WELL LOS  Not required for driven while  STREET HE ROLD OF FROM THE ANNUAL SECTION LOT CALL STREET HE ROLD OF FROM THE ANNUAL SECTION LOSS NOT WHITE ANNUAL SECTION	MM DD YY	7/2	3904 Y	" JUD "	28 20 30 31 32 33 34 35 38 37
STREET OR REPORT  WELL LOS  Not required for driven wells  STATE THE BOD OF CONGLATONE PREVIOUS PROVIDED TO THE CONGLATONE PREVIOUS PROVIDED TO THE CONGLATONE PREVIOUS PROVIDED TO THE CONGLATONE PROVIDED TO THE	8 13	15/	A Discourse	(TO NEAREST FOOT)	22 23 33 37 32 33 37
WELL LOS Not required for driven wolls  SITTE THE COLOR DETRUTATION LOSE PENETRYTED. THERE COLORAD FORTH MACHINES AND PENETRY ELECTRON COLORADO FORTH MACHINES AND PENETRY ELECTRON COLO	OWNERCAT	OCTIN 1)	row	NAW PARK First name TOWN TO	LIVE MIN T
WELL LOS  Not requised for driven wills  STATE THE GOOD POTMATCHER PENTITUTE. THEN COLOR BETH TO BROWN BY THE BROWN BY T	001	COV NA	100		IOTWELL 3
Not requised to driven wells  SYRIET THE PREVIATED THE THE THE THE PROPERTY THE THE THE PROPERTY THE		<u> </u>	un I		
STATE THE WIND OF FORMATIONS PRIEFTANTS, THEN COLOR DEPTH INCHORGE AND WATER BEARNON.  ESCAPPITON ON FEET DIRECT D				WELL HAS BEEN GROUTED Y N	1 2
ESCRIPTION VIEW PROWN TO			THEIR		
DESCRIPTION LETTER CONTROLLER DESCRIPTION AND APPLICATION OF WATER CANNOL FOR CHARLES OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  VIEL APPROPRIATE LETTER A WALL MAS ADMINIONED AND SEALED A WALL MAS ADMINIONED AND SEALED A WALL MAN TO MAN THE WELL MAS COMPLETED  E ELECTER CLOS OFFINANCE  WHEN THE WELL MAS COMPLETED  E ELECTER CLOS OFFINANCE  A WALL MAS ADMINIONED AND SEALED  A			check		HOURS PUMPED (nearest hour)
Shaley  Shaley	DESCRIPTION (Use additional sheets if needed)		if water bearing		PLIMPING BATE (nal. per min.) 15.
DEPTH OF GROUP SEAL (to reaserst foot)  Shale  Syrean  Syrean  Lourier Casing  Lourier Casing  Syrean  Lourier Casing  Lourier Casing  Syrean  Lourier Casing  Lourier				NO. OF BAGS 78 NO. OF FOUNDS 1700	11 15
Sheley  Sire No wat reach  Fracturel   39  Fra	top soil	0 3		CITEDONO OF THE PARTY OF THE PA	MEASURE PUMPING RATE Suchet
Casing netcorn   Casi	Shila	12 0			WATER LEVEL (distance from land surface)
Casing netcorn   Casi	) nave7	1 2 10			50
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED  WHEN THIS WELL WAS COMPLETED OF  PLEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS COMPLETED  TEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  NOWNERD OF WITH A BEEN CONSTRUCTED IN  NOWNERD OF SCREEN RECORD  THAN TWO DISTANCES  T	green	٨٠. ا ــ ا		casing CASING RECORD	BEFORE PUMPING TT.
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED  WHEN THIS WELL WAS COMPLETED OF  PLEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS COMPLETED  TEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  NOWNERD OF WITH A BEEN CONSTRUCTED IN  NOWNERD OF SCREEN RECORD  THAN TWO DISTANCES  T	mount Rock	5 134		/ insert \ 31 CO	WHEN PUMPING $\frac{500}{22}$ ft.
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED  WHEN THIS WELL WAS COMPLETED OF  PLEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS COMPLETED  TEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  NOWNERD OF WITH A BEEN CONSTRUCTED IN  NOWNERD OF SCREEN RECORD  THAN TWO DISTANCES  T	Econ tures	130 140		code PL OT	TYPE OF PUMP USED (for test)
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED  WHEN THIS WELL WAS COMPLETED OF  PLEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS COMPLETED  TEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  NOWNERD OF WITH A BEEN CONSTRUCTED IN  NOWNERD OF SCREEN RECORD  THAN TWO DISTANCES  T	1110100	101110	1		A air P piston T turbine
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED  WHEN THIS WELL WAS COMPLETED OF  PLEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS COMPLETED  TEST WELL CONVERTED TO PRODUCTION  WELL  HERBERY CERTIFY THAT THIS WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  WELL WAS BEEN CONSTRUCTED IN  NOWNERD OF WITH A BEEN CONSTRUCTED IN  NOWNERD OF SCREEN RECORD  THAN TWO DISTANCES  T	dieny worm	1,4-1		CASING top (main) casing of main casing	
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A WITH HYB WELL WAS ABANDONED AND SEALED  E ELECTRIC LOG OBTAINED  P TEST WELL CONVERTED TO PRODUCTION WELL  I HARBEY CERTIFY THAT THIS WELL WAS COMPLETED  P TEST WELL CONVERTED TO PRODUCTION WELL  I HARBEY CERTIFY THAT THIS WELL WAS DAYAND THAT THE INFORMATION PRESENTED  A WITH THAT THIS WELL WAS DAYAND THAT THE INFORMATION PRESENTED  FIND THE THAT THIS WELL WAS DAYAND THAT THE INFORMATION PRESENTED  FIND THE THAT THIS WELL WAS DAYAND THAT THE INFORMATION PRESENTED  FIND THE THAT THIS WELL WAS DAYAND THAT THE INFORMATION PRESENTED  FIND THAT THE SELL THAT THE INFORMATION PRESENTED  FIND THE THAT THE SELL THAT BELL THE BEST OF BY  CORPORATE VERY WAS ABANDONED AND SENTED  FIND THE THAT THE SELL THAT BELL THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THE THAT THE SELL THAT BELL THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THE THAT THE SELL THAT BELL THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THE THAT THE SELL THAT THE INFORMATION PRESENTED  FIND THAT THE SELL THAT THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THAT THE THE SELL THAT THE THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THE PRINC THAT THE THE BEST OF BY  THAT THE THE SELL THAT THE THE BEST OF BY  DIAMETER  OF SCREEN RECORD  THE PLUMP INSTALLED  DRILLER INSTALLED	' ROCK	1, 20-1200		TYPE (nearest inch)! (nearest root)	
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  WELL HYDROFRACTURED  OCIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED BE ELECTRIC LOG OFFINANT HIS WELL WAS COMPLETED DEPTH (nearest ft.)  CIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED BE ELECTRIC LOG OFFINANT HIS WELL WAS COMPLETED BY A WIND THAT THIS WELL HAS BEEN CONSTRUCTED IN WELL WITH ALL CONDITIONS STATED IN THE ABOVE CONFIDENCE WITH ALL SERVED CONFIDENCE WITH ALL SOMEWOOD STATED IN THE ABOVE CONFIDENCE WITH ALL SOMEWOOD STATE	į				Liet S submersible
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NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  WELL HYDROFRACTURED  WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED TO PRODUCTION WELL  I THEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANGE WITH COURSE WITH CONSTRUCTION AND INCOMPLEMENT WITH INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY MOWLEDGE  DRIVERED WITHOUT HAS THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANGE WITH COURSE WITH COUR					
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NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A WELL WAS COMPLETED  P. TEST WELL'CONVERTED TO PRODUCTION  WELL  I HERBEY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN NO COOPDANCE WITH ALL CONSTRUCTION'S AND NO COOPDANCE WITH ALL CONSTRUCTION'S AND NO COOPDANCE WITH ALL CONSTRUCTION'S AND NO CONPORMANCE WITH ALL				screen type	PLACE (A,C,J,P,R,S,T,O) 29
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  Ves  CIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED  P TEST WELL' CONVERTED TO PRODUCTION WELL  ACCORDANCE WITH COMAR 28 OLD AT WELL CONSTRUCTED IN ACCORDANCE WITH LOWNER STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED  DRIVE GERS LIC. NO. I M D D O TO  BROWNEDGE.  DRIVE GERS LIC. NO. I M D D O TO  CIRCLE SPROPOPIATE LETTER  A WELL WAS COMPLETED  S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S C 3  S S S C 3  S S C 3  S S S C 3  S S S S S S S S S S S S S S S S S S				insert STEEL BRASS OPEN	<b>B</b>
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  WELL HYDROFRACTURED  Ves WELL HYDROFRACTURED  Ves WELL HYDROFRACTURED  Ves WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED  P TEST WELL' CONVERTED TO PRODUCTION WELL  I HERBEN CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMPANION STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED WERNEN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  OR 2  DRIVERS SIGNATURE  MDE  WELL WAS COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRIVERS SIGNATURE  OF SCREEN  MDE USE ONLY  MDE USE ONLY  DIAMETER OF SCREEN  MDE USE ONLY  MDE USE ONLY  DIAMETER OTHER  OTHER  PUMP HORSE POWER  37  41  CASING HEIGHT (circle appropriate box and enter casing height)  LAND SURFACE  LAND SURFACE  LAND SURFACE  Deblow  SOLOTION OF WELL ON LOT  SHOW PERMANENTS TRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND I/OR  LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES  THAN TWO DISTANCES  WAS PLOWING WELL  MDE USE ONLY  MDE USE ONLY				code DI OIT	GALLONS PER MINUTE
NUMBER OF UNSUCCESSFUL WELLS:  WELL HYDROFRACTURED  Ves  CIRCLE APPROPRIATE LETTER  A WELL WAS ABANDONED AND SEALED  E ELECTRIC LOG OBTAINED  TEST WELL CONVERTED TO PRODUCTION  WELL  I HERBEY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ON CONFORMACE WITH ALL CONDITIONS STATED IN PRESENTED HERBEN IS ACCUMANCE WITH ALL CONDITIONS STATED IN PRESENTED HERBEN IN ACCUMANCE WITH ALL CONDITIONS STATED IN PRESENTED HERBEN IS ACCUMANCE WITH ALL CONDITIONS STATED IN PRESENTED HERBEN IS ACC					PUMP HORSE POWER
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WELL HYDROFRACTURED  CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED  P TEST WELL' CONVERTED TO PRODUCTION WELL  I HERBEN CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMPLICANS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HERBEN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  DRILLERS SIGNATURE  OF SCREEN  GRAVEL PACK  IF WELL DRILLED WAS FLOWING WELL  MOST WAS HOUSENED WELL  A 8 9 11 15 17 21  A above LAND SURFACE  LAND SURFACE  LAND SURFACE  LOCATION OF WELL ON LOT  SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND I/OR  LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES  THAN TWO DIST	NUMBER OF UNSUCCESS	, <b>V</b>		1 240 58 500	43 47
CIRCLE APPROPRIATE LETTER  A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED  P TEST WELL'CONVERTED TO PRODUCTION WELL  I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMPANION STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HERBEN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  DRILLERS SIGNATURE  OF SCREEN  OF	WELL HYDROFRACTURE		å	E R 9 11 15 1/ 21	and enter casing height)
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WHEN THIS WELL WAS COMPLETED  E ELECTRIC LOG OBTAINED  P TEST WELL'CONVERTED TO PRODUCTION  WELL  I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMMON STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HERBEN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  OF SCREEN  OF SCREEN	A A WELL WAS ABANDO	ONED AND SEALED		S 32 24 26 30 32 30	
TEST WELL CONVERTED TO PRODUCTION WELL  I HERBERY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMMENT STRUCTURES SUCH AS BUILDING, SEPTIC TANKS, AND I/OR LANDMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HERBERI IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  DRILLERS SIGNATURE  OF SCREEN  GRAVEL PACK F WELL OR LOCATION OF WELL ON LOT SHOW PERMANENT STRUCTURES SUCH AS BUILDING, SEPTIC TANKS, AND I/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)  GRAVEL PACK F WELL OR LOCATION OF WELL ON LOT SHOW PERMANENT STRUCTURES SUCH AS BUILDING, SEPTIC TANKS, AND I/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)  GRAVEL PACK F WELL OR LOCATION OF WELL ON LOT SHOW PERMANENT STRUCTURES SUCH AS BUILDING, SEPTIC TANKS, AND I/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)  F WELL OR LOCATION OF WELL ON LOT SHOW PERMANENT STRUCTURES SUCH AS BUILDING, SEPTIC TANKS, AND I/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)  DRILLERS SIGNATURE WAS FLOWING WELL MAS FLOWING WELL MISSTER IN BOX 68  MDE USE ONLY	WHEN HIS WELL WA			R 38 39 41 45 47 51	1000
I HERBEY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMPANIE AND INTO ACCORDANCE WITH COMPANIE AND INTO ACCORDANCE WITH LOWER STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HERBEN IS ACCUMATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  OF SCREEN  OF SCRE	D TEST WELL'CONVERT		N	E	
ACCORDANCE WITH DOWAR 84 ALL CONDITIONS STATED IN THE MOD'S INCHINE MOVE ON CONFIDENCE WITH ALL CONDITIONS STATED IN THE MOD'S INCHINE MOVE ON A COUNTRY AND THAT THE INFORMATION PRESENTED HEREIN IS ACCUMATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.  DRILLERS SIGNATURE  OF SCREEN THAN TWO DISTANCES (MEASUREMENTS TO WELL)  FOR SCREEN TO THE MODIFICATION OF THE MODE OF THE MODIFICATION	A LICENSE OF STREET THE TOTAL TOTAL	VELL HAS BEEN CONS	RUCTED IN	N	SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR
DRIVERS LIC. NO. 1 M WD 040  DRIVERS SIGNATURE  DRIVERS SIGNATURE  OMBET F WELL DRILLED  WAS FLOWING WELL  MOST MATCH SIGNATURE ON APPLICATION)  MOE USE ONLY  MOE USE ONLY	IN CONFORMANCE WITH ALL CO	D4.04 "WELL CONSTRU ONDITIONS STATED IN T. THE INFORMATION	THE ABOVE	OF SCREEN INCH)	LANDMARKS AND INDICATE NOT LESS
DRIGHERS LIC. NO. 1 M WD 0 40 I GRAVEL PACK IF WELL ORILLED WAS FLOWING WELL MISETT FIN BOX 68 68 MDE USE ONLY 167	HEREIN IS ACCURATE AND C KNOWLEDGE.	OMPLETE TO THE B	ST OF MY		(MEASUREMENTS TO WELL)
DAILLERS SIGNATURE ON APPLICATION)  MOST MATCH SIGNATURE ON APPLICATION)  MDE USE ONLY  MDE USE ONLY	DOMACDO LIO NO	MWD 04	<u>,                                    </u>	GRAVEL PACK	
DRILLER'S SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)  MDE USE ONLY  MDE USE ONLY  167	1 18 11 1	V. F. O.	· '	IF WELL DRILLED WAS FLOWING WELL	1 House
MOE USE ONLY (NOT TO BE FILLED IN BY DRILLER)  LIC. NO. 1  WQ  T  (E.R.O.S.)	DAILLER SIGNATURE	unewa	3	INSERT F IN BOX 68 68	167
LIC. NO. 1 III VO TO TO TO TO TO TO THE REAL OF THE PARTY	(MUST MATCH SIGNATURE	ON APPLICATION	i		100
	LIC. NO.1	TELEND I.	<u>'</u> — '''	-T (E.R.O.S.) W Q	W RE B
70	Wil Fan	<u> </u>			
SITE SUPERVISOR (sign. of driller or journeyman TELECORE LOG	SITE SUPERVISOR (sign	. of driller or journe different from perm	yman itteel	TELESCOPE LOG OTHER DATA	
	rannancible for sitework if	different from perm	itteel	INDICATOR OTHER DATA	· ·

	(MDE USE ONLY)	STATEOFMARYLAND
9	(IMDL OSL ONLY)	WELL COMPLETION REPORT   Ke Smith Well
7	THIS NUMBER IS TO BE PUNCHED	FILL IN THIS FORM COMPLETELY
	IN COLS. 3-6 ON ALL CARDS)	PLEASE TYPE
	ST/CO USE ONLY DATE WELL COM	PLETED Depth of Well PERMIT NO.
	MM DO YY 127/2-19/0	FROM "PERMIT TO DRILL WELL"
	8 13 19	20 (TO NEAREST FOOT) 28 29 30 31 32 33 34 35 36 37
	OWNER CATOCTIN MOI	IMAIN DARIZ
	STREET OR RED LANGUAGE	N Cos first name TOWN Thurmout
	SUBDIVISION IKE SMITH 5	SECTION LOT WELL #2
	WELL LOG	VOD DO
	Not required for driven wells	WELL HAS BEEN ROUTED  (Circle Appropriate Box)  (Circle Appropriate Box)
	STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING	PIMPING TEST
	the second secon	TYPE OF GROUTING MATERIAL (Circle one)  CEMENT (CIVI)  PRINTOUTS OF AVERTOR (CIVID ONE)  HOURS PUMPED (nearest hour)
1	DESCRIPTION (Use additional sheets if needed) FROM TO bearing	BENTONTE CLAY BIC
;	, , , , , , , , , , , , , , , , , , ,	NO. OF BAGS 46 41 NO. OF POUNDS 45/100 PUMPING RATE (gal. per min.) 100 •
	top soil 0 3	GALLONS OF WATER $240$
Į	Sheley 3 15	DEPTH OF GROUT SEAL (to nearest foot) 2.// MEASURE PUMPING RATE
ı	Soft mul 15 18	from $\frac{12}{12}$ ft. to $\frac{37}{12}$ ft
		48 TOP 52 54 BOTTOM 58 WATER LEVEL (distance from land surface)  (enter 0 if from surface)
ı	90acel 18 25	casing CASING RECORD BEFORE PUMPING 17 ft.
1	grew most ruck 25 35 Soft mud 35 35	types   SIT   CIO   17 20
Į	Soft med 35 37	(appropriate) STEEL CONCRETE WHEN PUMPING ft.
	a read mand hands	code below PLL OTT TYPE OF PUMP USED (for test)
	acreel	PLASTIC OTHER TIPE OF FOMP USED (101 test)
ł	gravel 44 51	MAIN Nominal diameter Total depth
ı	greathout Rock 51 55	CASING top (main) casing of main casing TYPE (nearest inch)! (nearest foot)  Contribugal R rotary (describe)
1		S C Centrifugal R rotary O (describe below)
1	, , , , , , , ,	60 61 63 64 66 70 J jet S submersible
١	great nout rock 98 329	E OTHER CASING (if used) 27
1	Open 379 380 V	A diameter depth (feet) H inch from to
١		C PUMP INSTALLED
١	9 rea Most nock 380 420	DRILLER INSTALLED PUMP YES (NO)
1	1 880 420	if DRILLER INSTALLS PUMP, THIS SECTION
ı		MUST BE COMPLETED FOR ALL WELLS.
ı		screen type SCREEN RECORD TYPE OF PUMP INSTALLED PLACE (A.C. J.P.R.S.T.O.)
l		SII BR HO INBOX 29
ı		appropriate   GAPACITY:
ı		code below   GALLONS PER MINUTE (to nearest gallon) 31 35
		PLASTIC OTHER
F		PUMP HORSE POWER  C 2 DEPTH (nearest ft.)  DEPTH (nearest ft.)
1	NUMBER OF UNSUCCESSFUL WELLS:	PUMP COLUMN LENGTH
	yes no ,	$\begin{bmatrix} 1 & 40 & 54 & 420 \end{bmatrix}$
	WELL HYDROFRACTURED Y	And a
Г	CIRCLE APPROPRIATE LETTER	H 2 above
ı	A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED	s
ı	E ELECTRIC LOG OBTAINED	C 3 below
	P TEST WELL CONVERTED TO PRODUCTION WELL	E 50 51
H	HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN	E SLOT SIZE 1 2 3 A LOCATION OF WELL ON LOT  SHOW PERMANENT STRUCTURE SUCH AS
Î	N CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE	DIAMETER (NEAREST N BUILDING, SEPTIC TANKS, AND /OR
H	APTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY NOWLEDGE.	OF SCREEN NCH)  LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES
۲	NOWLEDGE.	from to (MEASUREMENTS TO WELL)
ı	DRILLANS LIC. NO. 1 M) D D D D D D D D D D D D D D D D D D	GRAVEL PACKOLD SQW MILL PATRICIAN
	Glarge 7 States	IF WELL DRILLED WAS FLOWING WELL
1	DRILLERS SIGNATURE	INSERT F IN BOX 68 68
	(MUST MATCH SIGNATURE ON APPLICATION)	MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
	LIC. NO.1 MW D 486 1	(NOT TO BE FILLED IN BY DRILLER) T (E.R.O.S.) W Q
L	1128	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\
Γ	SITE SUPERVISOR (sign. of driller or journeyman	"
ľ	esponsible for sitework if different from permittee)	TELESCOPE LOG 74 75 76 CASING INDICATOR OTHER DATA
_		Since on the same of the same

### Ike Smith Well

L. FRANKLIN EASTERDAY, INC FIELD DATA SHEET

Page 1 of 1

Type of Test 24 HOUR PUMPING TEST
State Tag FR-95-0305 Owner: CATOCTW MOWNTAW PARK
Location: The Smile # 2 Water Level Below (M.P): 16.45
Start Time: 9 00 M.P Above Ground: 0.14

ft.well, 420 gpm 100

	It.wei	1, 420	gpii	100					·		
Min	Time	Level	GPM	Min	Time	Level	GPM	Min	Time	Level	GPM
1	9:01	22.7	100	35	9.35	50.3	7,500	13hrs	الد رال	73.1	100
2	9:02	25,2	/J 0	40	9.40	51.6	.30	14hrs	//:S	73.4	100
3	9:03	27.5	100	45	9.45	501.7	100	15hrs	200	23.7	100
4	9:04	2965	100	50		53.9	100	16hrs	1:00	74.0	100
5	9:05	31.4	100	55	9.55	5% 6	100	18hrs	3.00		130
6	906	32.85	100	60	10;00	55.3	100	20hrs		79.7	/38
7	9:07	37, 3	100	90	10130	58,6	/00	22hrs	7,00	75.25	//හට
8	9:08	35.6	100	120	1/,'00	61.3	100	24hrs	3,00	75.3	/00
9	9.09	36.45	/o <sup>©</sup>	150	11:30	62.8	ొం	25 /Q	10:30	75.45	100
10	9.10	37.7	100	180	12:00	64.5	100				
12	9/2	39.4	100	210	12:30	65,6	100				
14	974	90.8	100	240	1:30	66,4	100				
16	9.16	Ř	100	300	2,00	67,8	100			-	
18	9:8	43,5	100	360	3,00	69.1	/60				
20	9:20	44.6	/6°	420	4:00		160				
22	9,22	45,5	700	480	500	70,3	100				
24	924	46,5	100	9hrs	6:00		100				
26	9,26	47.3	/00	10hrs		71.2	/ଧ୍ର				
28	9:28	48,1	100	11hrs	8,500	71,8	160				
30	9,30	48.8	/00	12hrs	9,00	72.5	100				
				,							
				_							

### L. FRANKLIN EASTERDAY, INC FIELD DATA SHEET

Date:	10/	5//	06

Page 1 of 1

Type of Test

State Tag Location:

Recovery Check
FR-95-0305 Owner: CATOCIN MOUNTAIN PARK
THE 57474 # 2 Water Level Below (M.P):
M.P. Above Ground: Start Time:

ft.well, gpm

Min	Time	Level	GPM	Min	Time	Level	GPM	Min	Time	Level	GPM
1	10:31	73.2		35		52.6		13hrs			
2	10:32	72.6		40		49.5		14hrs			
3	10:33	72.0		45	11:15	45.6		15hrs			
4		71.5		50		42.4		16hrs			
5		71.0		55	11.25	40.15		18hrs			
6	10:34	70.5		60	11:30	37,8		20hrs			
7	10.37	70.0		90	12:00	30,0		22hrs			·
8	10,38	69.45		120	12:30	28,3		24hrs			
9	10.39	69.0		150	1:00	25,5					
10	10:40	68.45		-180		22,4		-			
12	10:42	67.3		210							
14	10:44	66.2		240							
16	10:46	65.0		300						·	
18	10:48	63.8		360							
20	10:50	62.6		420							
22	10:52	61.5		480							
24	10:54	60.0		9hrs							
26	10.56			10hrs							
28	10:58	57.3		11hrs							
30	11:00	56.2		12hrs							
			1.								
				,							



### National Park Service U.S. Department of the Interior

**Natural Resource Program Center** 



**Natural Resources Program Center** 1201 Oak Ridge Drive, Suite 250 Fort Collins, Colorado 80525

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